THOMSON SURVEY LIMITED

SURVEYORS AND RESOURCE PLANNERS

Our Reference: 10614.1 (FNDC)

30 March 2026

Resource Consents Department
Far North District Council
JB Centre
KERIKERI

Dear Sir/Madam

RE: Proposed Subdivision at 33 Redcliffs Road, Kerikeri – Richard Ayton

I am pleased to submit application on behalf of Richard Ayton, for a proposed subdivision of land at 33 Redcliffs Road, Kerikeri, zoned Rural Production. The proposal is one additional vacant lot and is a non complying activity.

The application fee of $3,044 has been paid separately via direct credit.

Regards

Lynley Newport
Senior Planner
THOMSON SURVEY LTD

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Te Kaunihera o Te Hiku o te Ika
For North District Council

Office Use Only Application Number:

Application for resource consent or fast-track resource consent

(Or Associated Consent Pursuant to the Resource Management Act 1991 (RMA)) (If applying for a Resource Consent pursuant to Section 87AAC or 88 of the RMA, this form can be used to satisfy the requirements of Form 9). Prior to, and during, completion of this application form, please refer to Resource Consent Guidance Notes and Schedule of Fees and Charges — both available on the Council's web page.

1. Pre-Lodgement Meeting

Have you met with a council Resource Covnsent representative to discuss this application prior to lodgement?

◯ Yes ☑ No

2. Type of consent being applied for

(more than one circle can be ticked):

◯ **Land Use**
◯ **Fast Track Land Use***
☑ **Subdivision**
◯ **Consent under National Environmental Standard**
(e.g. Assessing and Managing Contaminants in Soil)
◯ **Discharge**
◯ **Change of Consent Notice (s.221(3))**
◯ **Extension of time (s.125)**
◯ **Other (please specify)** _____

**The fast track is for simple land use consents and is restricted to consents with a controlled activity status.*

3. Would you like to opt out of the fast track process?

☑ Yes ◯ No

4. Consultation

Have you consulted with Iwi/Hapū? ◯ Yes ☑ No

If yes, which groups have you consulted with?

Who else have you consulted with?

For any questions or information regarding iwi/hapū consultation, please contact Te Hono at Far North District Council, tehonosupport@fndc.govt.nz

5. Applicant details

Name/s: Richard Ayton

Email:

Phone number:

Postal address:
(or alternative method of service under section 352 of the act)

Have you been the subject of abatement notices, enforcement orders, infringement notices and/or convictions under the Resource Management Act 1991? ○ **Yes** ✓ **No**

If yes, please provide details.

6. Address for correspondence

Name and address for service and correspondence (if using an Agent write their details here)

Name/s: Lynley Newport

Email:

Phone number:

Postal address:
(or alternative method of service under section 352 of the act)

All correspondence will be sent by email in the first instance. Please advise us if you would prefer an alternative means of communication.

7. Details of property owner/s and occupier/s

Name and Address of the owner/occupiers of the land to which this application relates (where there are multiple owners or occupiers please list on a separate sheet if required)

Name/s: D J Ayton (Trustee)

Property address/
location:

Postcode

8. Application site details

Location and/or property street address of the proposed activity:

Name/s: Ayton

Site address/ location: 33 Redcliffs Road
KERIKERI
Postcode

Legal description: Lot 1 DP 322274 **Val Number:**

Certificate of title: 88931

Please remember to attach a copy of your Certificate of Title to the application, along with relevant consent notices and/or easements and encumbrances (search copy must be less than 6 months old)

Site visit requirements:

Is there a locked gate or security system restricting access by Council staff? ◯ **Yes** ◯ **No**

Is there a dog on the property? ◯ **Yes** ◯ **No**

Please provide details of any other entry restrictions that Council staff should be aware of, e.g. health and safety, caretaker's details. This is important to avoid a wasted trip and having to re-arrange a second visit.

Gate access from River Drive

9. Description of the proposal

Please enter a brief description of the proposal here. Please refer to Chapter 4 of the *District Plan, and Guidance Notes*, for further details of information requirements.

Subdivision of land in the Rural Production Zone to create one additional lot

If this is an application for a Change or Cancellation of Consent Notice conditions (s.221(3)), please quote relevant existing Resource Consents and Consent Notice identifiers and provide details of the change(s), with reasons for requesting them.

10. Would you like to request public notification?

◯ **Yes** ◯ **No**

11. Other consent required/being applied for under different legislation

(more than one circle can be ticked):

◯ **Building Consent** Enter BC ref # here (if known)

◯ **Regional Council Consent (ref # if known)** Ref # here (if known)

◯ **National Environmental Standard Consent** Consent here (if known)

◯ **Other (please specify)** Specify 'other' here

12. National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health:

The site and proposal may be subject to the above NES. In order to determine whether regard needs to be had to the NES please answer the following:

Is the piece of land currently being used or has it historically ever been used for an activity or industry on the Hazardous Industries and Activities List (HAIL)? ◯ **Yes** ☑ **No** ◯ **Don't know**

Is the proposed activity an activity covered by the NES? Please tick if any of the following apply to your proposal, as the NESCS may apply as a result? ☑ **Yes** ◯ **No** ◯ **Don't know**

☑ **Subdividing land**
◯ **Disturbing, removing or sampling soil**
◯ **Changing the use of a piece of land**
◯ **Removing or replacing a fuel storage system**

13. Assessment of environmental effects:

Every application for resource consent must be accompanied by an Assessment of Environmental Effects (AEE). This is a requirement of Schedule 4 of the Resource Management Act 1991 and an application can be rejected if an adequate AEE is not provided. The information in an AEE must be specified in sufficient detail to satisfy the purpose for which it is required. Your AEE may include additional information such as written approvals from adjoining property owners, or affected parties.

Your AEE is attached to this application ☑ **Yes**

14. Draft conditions:

Do you wish to see the draft conditions prior to the release of the resource consent decision? ☑ **Yes** ◯ **No**

If yes, please be advised that the timeframe will be suspended for 5 working days as per s107G of the RMA to enable consideration for the draft conditions.

15. Billing Details:

This identifies the person or entity that will be responsible for paying any invoices or receiving any refunds associated with processing this resource consent. Please also refer to Council's Fees and Charges Schedule.

Name/s: (please write in full) Richard Ayton

Email:

Phone number:

Postal address:
(or alternative method of service under section 352 of the act)

Fees Information
An instalment fee for processing this application is payable at the time of lodgement and must accompany your application in order for it to be lodged. Please note that if the instalment fee is insufficient to cover the actual and reasonable costs of work undertaken to process the application you will be required to pay any additional costs. Invoiced amounts are payable by the 20th of the month following invoice date. You may also be required to make additional payments if your application requires notification.

15. Billing details continued...

Declaration concerning Payment of Fees

I/we understand that the Council may charge me/us for all costs actually and reasonably incurred in processing this application. Subject to my/our rights under Sections 357B and 358 of the RMA, to object to any costs, I/we undertake to pay all and future processing costs incurred by the Council. Without limiting the Far North District Council's legal rights if any steps (including the use of debt collection agencies) are necessary to recover unpaid processing costs I/we agree to pay all costs of recovering those processing costs. If this application is made on behalf of a trust (private or family), a society (incorporated or unincorporated) or a company in signing this application I/we are binding the trust, society or company to pay all the above costs and guaranteeing to pay all the above costs in my/our personal capacity.

Name: (please write in full) Richard Ayton

Signature:
(signature of bill payer) MANDATORY

16. Important Information:

Note to applicant

You must include all information required by this form. The information must be specified in sufficient detail to satisfy the purpose for which it is required.

You may apply for 2 or more resource consents that are needed for the same activity on the same form.

You must pay the charge payable to the consent authority for the resource consent application under the Resource Management Act 1991.

Fast-track application

Under the fast-track resource consent process, notice of the decision must be given within 10 working days after the date the application was first lodged with the authority, unless the applicant opts out of that process at the time of lodgement.

A fast-track application may cease to be a fast-track application under section 87AAC(2) of the RMA.

Privacy Information:

Once this application is lodged with the Council it becomes public information. Please advise Council if there is sensitive information in the proposal. The information you have provided on this form is required so that your application for consent pursuant to the Resource Management Act 1991 can be processed under that Act. The information will be stored on a public register and held by the Far North District Council. The details of your application may also be made available to the public on the Council's website, www.fndc.govt.nz. These details are collected to inform the general public and community groups about all consents which have been issued through the Far North District Council.

17. Declaration

The information I have supplied with this application is true and complete to the best of my knowledge.

Name (please write in full) Richard Ayton

Signature

A signature is not required if the application is made by electronic means

See overleaf for a checklist of your information...

Checklist

Please tick if information is provided

- ◯ Payment (cheques payable to Far North District Council)
- ◯ A current Certificate of Title (Search Copy not more than 6 months old)
- ◯ Details of your consultation with Iwi and hapū
- ◯ Copies of any listed encumbrances, easements and/or consent notices relevant to the application
- ◯ Applicant / Agent / Property Owner / Bill Payer details provided
- ◯ Location of property and description of proposal
- ◯ Assessment of Environmental Effects
- ◯ Written Approvals / correspondence from consulted parties
- ◯ Reports from technical experts (if required)
- ◯ Copies of other relevant consents associated with this application
- ◯ Location and Site plans (land use) AND/OR
- ◯ Location and Scheme Plan (subdivision)
- ◯ Elevations / Floor plans
- ◯ Topographical / contour plans

Please refer to Chapter 4 of the District Plan for details of the information that must be provided with an application. Please also refer to the RC Checklist available on the Council's website. This contains more helpful hints as to what information needs to be shown on plans.

Richard Ayton

Far North District Plan

PROPOSED SUBDIVISION

33 Redcliffs Road, Kerikeri

PLANNING REPORT AND ASSESSMENT OF ENVIRONMENTAL EFFECTS

Thomson Survey Ltd
Kerikeri

1.0 INTRODUCTION

1.1 The Proposal

The applicant proposes to carry out a subdivision of land at Redcliffs Road, Kerikeri to create one additional (vacant) lot. Proposed Lot 1 of 6900m^2 contains all existing built development and has frontage to Redcliffs Road via an existing well established driveway. It is proposed to create an additional Lot 2 of 1.348ha containing the unused grassed slope below the house, central gully, and the grassed slope up the other side. It is impractical to access the proposed vacant lot off Redcliffs Road and it is instead proposed to access it by way of shared access Lot 6 DP 191914 (of which the proposed lot will have a ¼ share) and then a right of way over Lot 3 DP 191914.

The draft scheme plan(s) attached in Appendix 1 show the lot layout, proposed amalgamation conditions, and easement arrangements. In providing proposed Lot 2 with a ¼ share of Lot 6 DP 191914, the existing amalgamation condition whereby Lots 3-5 DP 191914 each have a 1/3 share each must be cancelled. This will require a separate resolution in any decision issued by the Council.

The words on the face of the scheme plan are:

"Cancellation of existing Amalgamation Condition that sees Lot 6 DP 191914 held in three 1/3 shares by Lots 3, 4 & 5 DP 191914".

The proposed replacement (new) Amalgamation Condition reads:

"That Lots 3, 4 & 5 DP 191914 and Lot 2 hereon to each have a ¼ share in Lot 6 DP 191914".

1.2 Scope of this Report

This assessment and report accompanies the Resource Consent Application and is provided in accordance with Section 88 and Schedule 4 of the Resource Management Act 1991. The application seeks consent under the District Plan for a non complying activity subdivision. The name and address of the owner of the property is contained in the Form 9 Application form.

2.0 PROPERTY DETAILS

Location:	33 Redcliffs Road, Kerikeri (see Location Map in Appendix 2)
Legal description:	Lot 1 DP 322274
Record of Title:	88931, 2.0382ha in area (copy attached in Appendix 3 along with any relevant instruments)

3.0 SITE DESCRIPTION

3.1 Site Characteristics

The application site zoned Rural Production in both the Operative and Proposed District Plan. It has no resource overlay in the Operative Plan and contains no outstanding or high landscape or natural character areas. It is not within the coastal environment and is outside of any high density kiwi area. It is in a kiwi present area and Crown Land (marginal strip) abuts the site on its eastern boundary, with the Rangitane Stream (flowing north to south) on the other side of that Crown Land.

The property features a dwelling / garage with on site services, including driveway off Redcliffs Road, all to be within proposed Lot 1. There is well established garden and landscaping around the dwelling, with plantings behind and down slope of the house.

The balance of the site is in long, bisected by a gully accommodating an overland flow path and a small area of indigenous vegetation.

Looking south east from a potential building site within proposed Lot 2, with the existing dwelling to be within Lot 1 showing in the background. The proposed boundary is up the far slope along the existing hedge line.

Looking back up proposed Lot 2 in a south westerly direction, with gully at left and likely house site at far right of picture.

The property contains no LUC Class 1, 2 or 3 soils.

The NRC's on-line hazard maps, and the PDP maps, show the central gully as a River Flood Hazard Zone. The existing house and on-site services are well clear of this area, to the south east and closer to Redcliffs Road, and the proposed vacant lot has abundant elevated land on the northern side of the gully to accommodate development unaffected by any flood hazard.

The site is not mapped as containing any Biodiversity Wetlands (NRC online maps).

3.2 Legal Interests

Record of Title 88931 (the application site) is subject to Part IV A Conservation Act 1987. This is in regard to the Crown Land marginal strip already in existence along the eastern boundary. This notation will carry down to any new titles created.

The title is subject to an electricity right in very small part at road edge, affecting proposed Lot 1 only. This easement is shown A on the scheme plan in Appendix 1.

The title has various appurtenant rights, for electricity and for right of way, however these no longer appear active or relevant.

The application site is subject to a Consent Notice D574042.5, registered in 2001. This is attached as part of Appendix 3 and contains four clauses. It related to DP 191914 of which the application site was once a part.

3.3 Consent History

The property file has the following resource consents listed:

BIC947, historic subdivision issued in 1978;
BIC1256, another historic subdivision with a different layout, issued in 1980;
RC 1950328, subdivision issued in 1995;
RC 1970080, subdivision issued in 1997; and
RC 2030179, subdivision issued in 2002.

4.0 SCHEDULE 4 – INFORMATION REQUIRED IN AN APPLICATION

Clauses 2 & 3: Information required in all applications

(1) An application for a resource consent for an activity must include the following:	
(a) a description of the activity: .	Refer Sections 1 of this Planning Report.
(b) an assessment of the actual or potential effect on the environment of the activity:	Refer to Section 6 of this Planning Report.
(b) a description of the site at which the activity is to occur:	Refer to Section 3 of this Planning Report.
(c) the full name and address of each owner or occupier of the site:	This information is contained in the Form 9 attached to the application.
(d) a description of any other activities that are part of the proposal to which the application relates:	Refer to Section 3 of this Planning Report for existing activities within the site. The application is for subdivision only and there are no other activities that are part of the proposal.
(e) a description of any other resource consents required for the proposal to which the application relates:	Consent is only being sought for subdivision, pursuant to the Far North Operative District Plan.

(f) an assessment of the activity against the matters set out in Part 2:	Refer to Section 7 of this Planning Report.
(g) an assessment of the activity against any relevant provisions of a document referred to in section 104(1)(b), including matters in Clause (2): *(a) any relevant objectives, policies, or rules in a document; and* *(b) any relevant requirements, conditions, or permissions in any rules in a document; and* *(c) any other relevant requirements in a document (for example, in a national environmental standard or other regulations).*	Refer to Sections 5 and 7 of this Planning Report.
(3) An application must also include any of the following that apply:	
(a) if any permitted activity is part of the proposal to which the application relates, a description of the permitted activity that demonstrates that it complies with the requirements, conditions, and permissions for the permitted activity (so that a resource consent is not required for that activity under section 87A(1)):	There is an existing dwelling within the site .
(b) if the application is affected by section 124 or 165ZH(1)(c) (which relate to existing resource consents), an assessment of the value of the investment of the existing consent holder (for the purposes of section 104(2A)):	There is no existing resource consent. Not applicable.
(c) if the activity is to occur in an area within the scope of a planning document prepared by a customary marine title group under section 85 of the Marine and Coastal Area (Takutai Moana) Act 2011, an assessment of the activity against any resource management matters set out in that planning document (for the purposes of section 104(2B)).	The site is not within an area subject to a customary marine title group. Not applicable.

Clause 4: Additional information required in application for subdivision consent

(4) An application for a subdivision consent must also include information that adequately defines the following:	
(a) the position of all new boundaries: *(b) the areas of all new allotments, unless the subdivision involves a cross lease, company lease, or unit plan:* *(c) the locations and areas of new*	Refer to Scheme Plans in Appendix 1.

reserves to be created, including any esplanade reserves and esplanade strips: *(d) the locations and areas of any existing esplanade reserves, esplanade strips, and access strips:* *(e) the locations and areas of any part of the bed of a river or lake to be vested in a territorial authority under section 237A:* *(f) the locations and areas of any land within the coastal marine area (which is to become part of the common marine and coastal area under section 237A):* *(g) the locations and areas of land to be set aside as new roads.*	

Clause 5: Additional information required for application for reclamation – not applicable.

Clause 6: Information required in assessment of environmental effects

(1) An assessment of the activity's effects on the environment must include the following information:	
(a) if it is likely that the activity will result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity:	Refer to Section 6 of this planning report. The activity will not result in any significant adverse effect on the environment.
(b) an assessment of the actual or potential effect on the environment of the activity:	Refer to Section 6 of this planning report.
(c) if the activity includes the use of hazardous installations, an assessment of any risks to the environment that are likely to arise from such use:	Not applicable as the application does not involve hazardous installations.
(d) if the activity includes the discharge of any contaminant, a description of— *(i) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and* *(ii) any possible alternative methods of discharge, including discharge into any other receiving environment:*	The subdivision does not involve any discharge of contaminant.
(e) a description of the mitigation measures (including safeguards and contingency plans where relevant) to be undertaken to help prevent or reduce the actual or potential effect:	Refer to Section 6 of this planning report.
(f) identification of the persons affected by the activity, any consultation undertaken, and any response to the views of any person consulted:	Refer to Section 8 of this planning report.

g) if the scale and significance of the activity's effects are such that monitoring is required, a description of how and by whom the effects will be monitored if the activity is approved:	No monitoring is required as the scale and significance of effects does not warrant any.
(h) if the activity will, or is likely to, have adverse effects that are more than minor on the exercise of a protected customary right, a description of possible alternative locations or methods for the exercise of the activity (unless written approval for the activity is given by the protected customary rights group).	No protected customary right is affected.

Clause 7: Matters that must be addressed by assessment of environmental effects (RMA)

(1) An assessment of the activity's effects on the environment must address the following matters:	
(a) any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects:	Refer to Sections 6 and 8 of this planning report and also to the assessment of objectives and policies in Section 7.
(b) any physical effect on the locality, including any landscape and visual effects:	Refer to Section 6. The site has no areas of outstanding landscape or areas of natural character.
(c) any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity:	Refer to Section 6. The site has a small area of indigenous vegetation contained within the upper reaches of the gully to be within Lot 2. This currently has no protection and it is proposed to fence it, and the rest of the gully.
(d) any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations:	Refer to Section 6.0. The site is not known to contain any historical, spiritual or cultural values.
(e) any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants:	The subdivision will not result in the discharge of contaminants, nor any unreasonable emission of noise.
(f) any risk to the neighbourhood, the wider community, or the environment through natural hazards or hazardous installations.	The gully within the subdivision site is mapped as being susceptible to flooding. This area is avoided by existing development and can similarly be avoided for any future development on the proposed vacant. Lot.

5.0 ACTIVITY STATUS

5.1 Operative District Plan (ODP)

The property is zoned Rural Production under the ODP, with no resource overlays applying.

TABLE 13.7.2.1: MINIMUM LOT SIZES
(viii) RURAL PRODUCTION ZONE

Controlled Activity Status (Refer also to 13.7.3)	**Restricted Discretionary Activity Status (Refer also to 13.8)**	**Discretionary Activity Status (Refer also to 13.9)**
The minimum lot size is 20ha.	1. Subdivision that complies with the controlled activity standard, but is within 100m of the boundary of the Minerals Zone; 2. The minimum lot size is 12ha; or 3. A maximum of 3 lots in any subdivision, provided that the minimum lot size is 4,000m2 and there is at least 1 lot in the subdivision with a minimum lot size of 4ha, and provided further that the subdivision is of sites which existed at or prior to 28 April 2000, or which are amalgamated from titles existing at or prior to 28 April 2000; or 4. A maximum of 5 lots in a subdivision (including the parent lot) where the minimum size of the lots is 2ha, and where the subdivision is created from a site that existed at or prior to 28 April 2000; 5.....	1. The minimum lot size is 4ha; or 2. A maximum of 3 lots in any subdivision, provided that the minimum lot size is 2,000m² and there is at least 1 lot in the subdivision with a minimum size of 4ha, and provided further that the subdivision is of sites which existed at or prior to 28 April 2000, or which are amalgamated from titles existing at or prior to 28 April 2000; or 3. A subdivision in terms of a management plan as per Rule 13.9.2 may be approved. ....

The subdivision is a property with a title younger than April 2000. The lots are smaller than 2ha. The subdivision is not a management plan. The application is therefore a non complying subdivision activity.

Zone Rules:

I have not identified any zone rules relevant to the proposal that are breached. The existing dwelling, to be within Lot 1 on the scheme plan, complies with bulk and location rules and other zone rules applying to the Rural Production Zone.

Total impermeable surface coverage within proposed Lot 1 is estimated at 645m². This is 9.3% of the proposed lot area, meeting the permitted activity threshold. Building coverage is also within the permitted threshold of 12.5%.

District Wide Rules:

Chapter 12.1 Landscapes and Natural Features – the site contains no areas mapped as requiring consent to Chapter 12.1.

Chapter 12.2 Indigenous Vegetation – the proposal does not involve any clearance of indigenous vegetation.

The subdivision will not require earthworks in excess of Chapter 12.3 permitted volume and cut/fill face height thresholds.

The site is not mapped as having any coastal hazard in the ODP so rules in Chapter 12.4 in regard these hazards are not relevant. The existing residential unit has existing use rights in terms of Fire Risk to Residential Units, and proposed Lot 2 can readily accommodate a dwelling with a minimum 20m buffer distance to the dripline of any area of trees.

The site contains no mapped or scheduled archaeological, heritage or cultural features so no rules in Chapters 12.5, 12.5A or 12.5B apply.

No impermeable surfaces will be within 10m of the overland flow path through the gully and any new on-site wastewater system to be within Lot 2 can be located a minimum 30m from that flow path. No rules in Chapter 12.7 are breached.

Chapters 12.8 Hazardous Facilities and 12.9 Energy Efficiency are not relevant and have not been considered.

Chapter 14 is not relevant as the property does not immediately have a boundary with any qualifying waterbody. There is an existing Crown Land marginal strip between the property and the Rangitane Stream.

Chapter 15.1.6C relates to access. The site gets access off a sealed public road (Redcliffs Road). One proposed lot will retain that access, all to the required standard with nothing changing in the way of use. The other proposed lot (the additional vacant one) is to gain access off River Drive, Council maintained sealed public road. Private access (shared) to get to new lot will serve a total of four properties, resulting in a requirement for 3m metal carriageway width with passing bays where required. This will be achieved by way of conditions of consent. The new crossing to River Drive will be formed to the required double width standard with culvert where required. I have not identified any breaches of rules in Chapter 15.1.6C.

5.2 Proposed District Plan

The property is zoned Rural Production under the new PDP. The PDP was publicly notified on 27th July 2022 and hearings are complete. No decisions on submissions have been publicly notified as yet. Whilst the majority of rules in the PDP will not have legal effect until such time as the FNDC publicly notifies its decisions on submissions, there are certain rules that have been identified in the PDP as having immediate legal effect and that may therefore need to

be addressed in this application and may affect the category of activity under the Act. These include:

Rules HS-R2, R5, R6 and R9 in regard to hazardous substances on scheduled sites or areas of significance to Maori, significant natural areas or a scheduled heritage resource.

As the application site and proposal does not involve hazardous substances, these rules are not relevant to the proposal.

Heritage Area Overlays – N/A as none apply to the application site.

Historic Heritage rules and Schedule 2 – N/A as the site does not have any identified (scheduled) historic heritage values.

Notable Trees – N/A – no notable trees on the site.

Sites and Areas of Significance to Maori – N/A – the site does not contain any site or area of significance to Maori.

Ecosystems and Indigenous Biodiversity – Rules IB-R1 to R5 inclusive.

These rules are only relevant where proposing clearance. None is proposed.

Subdivision (specific parts) – only subdivision provisions relating to land containing Significant Natural Area or Heritage Resources have immediate legal effect. The site contains no scheduled or mapped Heritage Resources and it is not intended to subdivide under any provisions relating to Environmental Benefit (indigenous vegetation protection).

Activities on the surface of water – N/A as no such activities are proposed.

Earthworks – Only some rules and standards have legal effect. These are Rules EW-R12 and R13 and related standards EW-S3 and ES-S5 respectively. EW-R12 and associated EW-S3 relate to the requirement to abide by Accidental Discovery Protocol if carrying out earthworks and artefacts are discovered. The subdivision works will involve the formation of a crossing and private access and will involve a small volume of earthworks (noting reasonably level ground). Any earthworks can be subject to the ADP. EW-13 and associated EW-S5 relate to ensuring Erosion and Sediment Control measures are in place during earthworks. They cite compliance with GD05. Any earthworks necessary will need to ensure appropriate Erosion and Sediment Control measures are in place during works.

Signs – N/A – signage does not form part of this application.

Orongo Bay Zone – N/A as the site is not in Oronga Bay Zone.

In summary, there are no zone rules in the PDP with immediate legal effect that affect the proposal's activity status.

5.3 Consent Notice D574042.5

The title is subject to an existing consent notice that has four clauses. The first requires all proposed buildings to be finished in recessive colours compatible with the surrounding environs. This will continue to apply to the vacant lot and will assist in ensuring development compatible with the surrounding area and character.

The second clause prevents buildings from being constructed within areas marked X, Y and Z on DP 191914. None of these areas are within the application site.

The third clause requires rainwater collected off the roof to be filtered. This will continue to apply.

The final clause limits the number of "units" per site to be used for living purposes to one per site. This same clause applied to what was historically known as Lot 2 DP 191914, and which has since been subdivided to create Lots 1 and 2 DP 343454, in a very similar way to what is proposed in this application. The consent notice is clearly not an impediment to subdivision, with each new lot to be subject to the same clause. If the consent notice was intended to prevent future subdivision it would have been worded as such.

6.0 ASSESSMENT OF ENVIRONMENTAL EFFECTS

6.1 Allotment sizes and dimensions

Proposed Lot 1 supports existing development and retains sufficient area to continue to accommodate that development, including its on-site wastewater system. Proposed Lot 2 is vacant and over 1.3ha in area. There is ample room for a 30m x 30m square building envelope within its boundaries, complying with boundary setback requirements.

6.2 Natural and Other Hazards

The site's centrally located gully is mapped as being subject to flood hazard. The existing dwelling and access within proposed Lot 1 is well clear of, and elevated above, any area mapped as flood hazard. Similarly a dwelling can be established on the vacant proposed Lot 2 outside of, and above, any area mapped as flood hazard.

The application is supported by a Subdivision Site Suitability Engineering Report, attached in Appendix 4. Section 9 of that report discusses Natural Hazard Assessment. Natural Hazards, as defined in the Resource Management Act 1991 are assessed in the report's Table 11. In short there is no reason pursuant to s106 of the Act as to why the subdivision cannot be granted or future residential development cannot occur.

6.3 Water Supply

Refer to Section 7 of the Engineering Report in Appendix 4. It is recommended that roof runoff water tanks be adopted for potable water supply and for fire fighting water supply. The Council will likely impose its standard consent notice in this regard on Lot 2. I do not

believe it reasonable to impose any such consent notice on Lot 1 because this contains existing residential development.

6.4 Stormwater Disposal

Refer to Section 6 in the Engineering Report in Appendix 4. Table 5 within that report shows that both proposed lots' impermeable surface coverage will easily meet permitted activity standards. The report recommends driveway runoff be collected by means of a swale and underground stormwater tank. It contains a Concept Stormwater Attenuation for both driveway and roof run off as it relates to Lot 2.

The report confirms that no additional attenuation is required for the existing development to be within Lot 1.

6.5 Sanitary Sewage Disposal

Refer to the Engineering Report's Section 5 Wastewater Assessment. The report's concept design is modelled on a five-bedroom dwelling with a peak occupancy of eight people. The report notes that the selection of a wastewater treatment system will be provided by future developers at building consent stage. This will refine peak occupancy. The report sees no issue with a treatment system being able to comply with the Regional Plan's permitted activity standards.

The report addresses the existing house system, which is septic tank treatment to disposal field. This is located to the east of the house adjacent to the carparking area and it can be confirmed that the treatment system and associated disposal fields are contained within the lot boundaries.

6.6 Energy Supply & Telecommunications

Power and telecoms are not a requirement for rural subdivisions. The house to be within Lot 1 has services. It is suggested that a consent notice be applied to Lot 2 stating that power and telecommunications were not a requirement of the subdivision and remain the responsibility of the lot owner, including providing power supply sufficient to operate any wastewater system installed on the site that requires power to operate. Despite not being required, the scheme plan includes power and telecommunications within the purposes of the easement being proposed, so that a future lot owner is able to install reticulation if they wish to.

6.7 Easements for any purpose

Refer to scheme plan in Appendix 1. It is proposed to include Easement B over Lot 3 of DP 191914 in favour of new proposed Lot 2. An existing electricity easement is shown as A over Lot 1.

6.8 Property Access

The existing crossing to the dwelling to be within Lot 1 is well established and with no additional use envisaged, can remain as is.

It is proposed that new Lot 2 be accessed off River Drive. There is currently no crossing or entrance formed. Section 10 of the Engineering Report in Appendix 4 contains commentary in regard to both the crossing off River Drive, and to the standard of internal shared private access required to the boundary of the new lot.

Where the access is within the shared access Lot 6 DP 191914 it will serve 4 potential (future) HE's and will therefore need to be a minimum 7.5m legal width and have a minimum carriageway width of 3m with passing bays where required. It already meets the 7.5m legal width requirement and a condition of consent can require the physical formation standard outlined above. The proposed new ROW B only serves Lot 3 DP 191914 and the proposed new lot – a total of 2 potential (future) HE's. This requires a minimum carriageway width of 3m, with no passing bays, with minimum legal width of 5m. It has been shown at 10m legal width.

Approximate location (by totara tree) where ROW B's corner is located.

The new vehicle crossing for proposed Lot 2 will be formed at subdivision formation (refer to Engineering Report, Section 10, Table 13). Sight distances of approximately 115m (looking north) and over 200m (looking south west) are achievable. The report assesses operating speed at 70km/h, requiring the 115m (reference to FNDC Engineering Standards 2023).

Entrance into Lot 6 DP 119914 (access lot) is at the steel gate, view looking south back towards Kapiro Road intersection in the distance.

Looking in the opposite direction to the north.

6.9 Earthworks and Utilities

Refer to Engineering Report in Appendix 4. The Report's Section 8 addresses earthworks. It confirms that estimated volumes to carry out subdivision siteworks will be well within the permitted activity volume threshold. And the maximum cut/fill height will comply with the permitted activity. The works will also comply with the Regional Plan's 'area' requirement for permitted activity status. The report makes some general recommendations in its section 8.2.

6.10 Building Locations

There are some physical constraints as to the location of a building within proposed Lot 2 in that a dwelling should not be placed so low down the slope towards the gully as to be at risk from flood hazard. This is readily achievable (refer to Engineering Report in Appendix 4). On site services, particularly wastewater treatment and disposal must also be located clear of any areas restricted by flood hazard or slope factors. Again this is readily achievable.

6.11 Preservation of heritage resources, vegetation, fauna and landscape, and land set aside for conservation purposes

The site does not contain any of the following:
There are no Notable Trees (Appendix 1D of the DP);
No Historic Sites, Buildings of Objects (1E);
No Outstanding Natural Features or Outstanding Landscape Features (1A and 1B); and
No archaeological sites (1G) or Sites of Cultural Significance to Māori (1F).

Indigenous Flora & Fauna:

The title being subdivided is not mapped as containing any Protected Natural Areas (refer Far North Maps – Reserves and Protected Area layer). There is a centrally located gully through the site, with a small area of mixed species indigenous vegetation at the gully's upper (western) end. This area is not currently fenced off. It is proposed to fence the gully off.

The application site is kiwi present, but not high density kiwi, being on the south side of the Rangitane Stream, a 'natural' boundary to the Kerikeri Peninsula and areas known to support kiwi. For this reason I suggest that it is not justifiable to ban dogs and cats from being kept on the lots. It would, however, be reasonable to require that any dog or cat kept on a lot be kept inside at night.

The Crown Land marginal strip forming the property's eastern boundary is administered by the Department of Conservation on behalf of the Crown. The majority of this boundary rests with proposed Lot 1 which supports the existing development on the property. Only a small corner shares a boundary with proposed Lot 2. The boundary between Lot 2 and Crown Land is not currently fenced, but can be if the Council considers this necessary. The proposed subdivision does not hinder the department's ability to administer land for which it is responsible and does not impede public access along the marginal strip.

Heritage Resources

There are no heritage resources within the application site.

Cultural Values

There are no Sites of Cultural Significance to Maori within the application site. The property is separated from the Rangitane Stream by an existing marginal strip. Supporting engineering reports confirm that the proposed vacant can readily accommodate residential use with on-site services without adversely affecting water quality or indigenous vegetation / habitat.

6.12 Soil

The application site does not contain any soils that meet the definition of "highly productive land". The land to be in proposed Lot 2 supports limited grazing only. However, as with the existing dwelling to be within Lot 1, the size of proposed Lot 2 is such that it could support

domestic scale fruit and vegetation crops if a future lot owner wishes to. The proposal does not adversely affect the life supporting capacity of soils.

6.13 Access to reserves and waterbodies

Refer to commentary earlier in this report in regard to the Crown Land adjacent to the Rangitane Stream. Public access along the stream is already in place via the Crown Land (marginal strip). This is not affected by the proposed subdivision.

6.14 Land use compatibility (reverse sensitivity)

The land between River Drive and the Rangitane Stream is now predominantly large lot residential or lifestyle living. Whilst some lots are vacant and yet to be built on, they undoubtedly will be developed, for example the three lots utilising the shared access way range in area from 4725m^2 to 7690m^2 in area, with the property adjacent to them being 4487m^2 in area. Adjoining River Drive on its outer perimeter is now dominated by residential use on large lots, rather than rural production. In short the proposal will result in a level of density consistent with the existing character of the area, which is no longer rural production. The proposal will not result in any significantly different risk of reverse sensitivity issues arising than what currently exists.

The horticultural operation on the other side of River Drive is some distance from the proposed new lot and well screened, with several intervening properties. There is rural use across Rangitane Stream, however, the stream and its marginal strip provides a substantial 'buffer' (vegetated) such that I do not believe any adverse reverse sensitivity issues will arise.

6.15 Rural Amenity and Character

Refer to comments above under 6.14. The level of density being proposed is entirely consistent with the size range of lots adjacent to, and in the vicinity of, the application site. The proposal will add one additional dwelling in a location that can readily accommodate that level of development without adversely affecting the rural amenity and character of the immediate area.

The existing settlement pattern, showing lot sizes, is clearly shown on the location map in Appendix 2. In addition, Lot 2 DP 532825 has consent for two additional large residential lots.

Future built development on the lot can readily comply with boundary setback, sunlight, height, building coverage and stormwater management permitted activity rules.

In summary I believe the proposal will result in less than minor effects in terms of amenity and character values.

6.16 Other Matters

The application site is not in proximity to any airport and not in the coastal environment. There is no National Grid Corridor within or near the site.

Precedent Effects

Although a non complying activity, I believe there are sufficient features and circumstances of the proposal that sets it apart from elsewhere in the zone. These are outlined in part under

sections 6.14 and 6.15 above. Whilst there is a consent notice applying to the title restricting the existing title to a single unit, precedent has been set by the subdivision of the property to the south into two allotments, this property also having been subject to the same Consent Notice. The Consent Notice does not restrict further subdivision.

It would now be a perverse result if the ODP's subdivision rules insist on retaining rural use of the land in proposed Lot 2 given that it is surrounded by residential use with an ongoing risk of reverse sensitivity issues arising. A better result is to allow for residential use at a scale consistent with the existing character of the area.

The other distinguishing feature, and a positive one, is the proposal to fence off and protect a gully containing indigenous vegetation and freshwater habitat.

In addition, the site contains no highly productive land.

It is my opinion that granting the proposal, with conditions, will not threaten the integrity of the District Plan or cause any negative or adverse precedent effect.

Cumulative Effects

For the same reasons as outlined above, no adverse cumulative effects result from the proposed subdivision. I believe the application site lends itself to what is effectively 'in fill' residential living on a lot within an area supporting similar sized properties. I refer you to my commentary under 6.15 above.

7.0 STATUTORY ASSESSMENT

7.1 Operative District Plan Objectives and Policies

Subdivision Objectives & Policies

Objectives

13.3.1 To provide for the subdivision of land in such a way as will be consistent with the purpose of the various zones in the Plan, and will promote the sustainable management of the natural and physical resources of the District, including airports and roads and the social, economic and cultural well being of people and communities

I believe the proposal promotes the sustainable management of the natural and physical resources of the District, including the social, economic and cultural well being of people and communities.

13.3.2 To ensure that subdivision of land is appropriate and is carried out in a manner that does not compromise the life-supporting capacity of air, water, soil or ecosystems, and that any actual or potential adverse effects on the environment which result directly from subdivision, including reverse sensitivity effects and the creation or acceleration of natural hazards, are avoided, remedied or mitigated.

The Assessment of Environmental Effects, and supporting Engineering report, conclude that the proposed subdivision is appropriate for the site and that any actual or potential adverse effects can be avoided, remedied or mitigated.

Objectives 13.3.3 and 13.3.4 refer to outstanding landscapes or natural features; and scheduled heritage resources; and to land in the coastal environment. The application site contains no outstanding landscape or natural features, and is not within the coastal environment. In subdividing land outside of any of the areas referred to, the proposal gives effects to these objectives.

13.3.5 To ensure that all new subdivisions provide a reticulated water supply and/or on-site water storage and include storm water management sufficient to meet the needs of the activities that will establish all year round.

The proposal includes provision for a future lot to provide for its own on-site water storage for potable use. Fire fighting supply can also be accommodated on the lot. Stormwater Management has been addressed in supporting reports and can be designed to ensure no off site adverse effects.

13.3.6 To encourage innovative development and integrated management of effects between subdivision and land use which results in superior outcomes to more traditional forms of subdivision, use and development, for example the protection, enhancement and restoration of areas and features which have particular value or may have been compromised by past land management practices.

This objective is likely intended to encourage Management Plan applications, and does not have a lot of relevance to this proposal.

13.3.7 To ensure the relationship between Maori and their ancestral lands, water, sites, wahi tapu and other taonga is recognised and provided for.

And related Policy

13.4.11 That subdivision recognises and provides for the relationship of Maori and their culture and traditions, with their ancestral lands, water, sites, waahi tapu and other taonga and shall take into account the principles of the Treaty of Waitangi.

The site is not known to contain any sites of cultural significance to Maori, or wahi tapu. The site does not include or adjoin any river or stream. There is a gully through the centre of the site, containing an overland flow path. Development on the vacant lot can occur without adversely impacting on this feature. The Site Suitability Report supporting the application confirms the additional lot can accommodate an onsite wastewater treatment and disposal system in compliance with Regional Plan requirements and with no off site adverse effects. Stormwater management can also be provided for. I do not believe that the proposal adversely impacts on the ability of Maori to maintain their relationship with ancestral lands, water, sites, wahi tapu and other taonga.

13.3.8 To ensure that all new subdivision provides an electricity supply sufficient to meet the needs of the activities that will establish on the new lots created.

Power is not a requirement for non urban allotments.

13.3.9 To ensure, to the greatest extent possible, that all new subdivision supports energy efficient design through appropriate site layout and orientation in order to maximise the ability to provide light, heating, ventilation and cooling through passive design strategies for any buildings developed on the site(s).

13.3.10 To ensure that the design of all new subdivision promotes efficient provision of infrastructure, including access to alternative transport options, communications and local services.

A future lot owner will have sufficient scope within the site to include energy efficiencies within their individual home designs, via active means such as solar panels, or passive design strategies such as sky lights and orientation.

The subdivision utilises existing access off a Council road (Redcliffs Road), and will form access of another Council road (River Drive) for the proposed new lot. The site is reasonably close to the Kerikeri township and road network.

Objective 13.3.11 is not discussed further as there is no National Grid on or near the subject site.

Policies

13.4.1 That the sizes, dimensions and distribution of allotments created through the subdivision process be determined with regard to the potential effects including cumulative effects, of the use of those allotments on:
(a) natural character, particularly of the coastal environment;
(b) ecological values;
(c) landscape values;
(d) amenity values;
(e) cultural values;
(f) heritage values; and
(g) existing land uses.

The values outlined above, along with existing uses, have been discussed earlier in this report. I believe regard has been had to items (a) through (g), where relevant, in the design of the subdivision.

13.4.2 That standards be imposed upon the subdivision of land to require safe and effective vehicular and pedestrian access to new properties. And

13.4.5 That access to, and servicing of, the new allotments be provided for in such a way as will avoid, remedy or mitigate any adverse effects on neighbouring property, public roads (including State Highways), and the natural and physical resources of the site caused by silt runoff, traffic, excavation and filling and removal of vegetation.

Access is either existing or can be readily formed to Council standard in a safe and effective manner. Any physical works required for access is minimal and will have no adverse effect on the natural and physical resources of the site. No vegetation removal is required.

13.4.3 That natural and other hazards be taken into account in the design and location of any subdivision.

The site is subject to flood hazard through the central gully, but existing and future building sites can remain well clear and above that hazard.

13.4.4 That in any subdivision where provision is made for connection to utility services, the potential adverse visual impacts of these services are avoided.

I believe there are no above ground utility services.

13.4.6 That any subdivision proposal provides for the protection, restoration and enhancement of heritage resources, areas of significant indigenous vegetation and significant habitats of indigenous

fauna, threatened species, the natural character of the coastal environment and riparian margins, and outstanding landscapes and natural features where appropriate.

The site is not known to contain any of the natural and physical resources listed in 13.4.6. Notwithstanding this, there is a small stand of mixed species indigenous vegetation within the gully proposed to be fenced off. The property is separated from the Rangitane Stream by an existing Crown Land marginal strip.

Policy 13.4.7 is not discussed as this relates to carparking associated with non residential activities (not relevant) or esplanade areas, none of which are required or considered necessary.

13.4.8 That the provision of water storage be taken into account in the design of any subdivision.

This is discussed earlier. The vacant lot can provide for on-site water storage.

Policies 13.4.9 and 13.4.10 are not discussed further. The former relates to bonus development donor and recipient areas, which are not contemplated in this proposal; whilst the latter only applies to subdivision in the Conservation Zone.

13.4.12 That more intensive, innovative development and subdivision which recognises specific site characteristics is provided for through the management plan rule where this will result in superior environmental outcomes.

The application is not lodged as a Management Plan application.

13.4.13 Subdivision, use and development shall preserve and where possible enhance, restore and rehabilitate the character of the applicable zone in regards to ***s6 matters****. In addition subdivision, use and development shall avoid adverse effects as far as practicable by using techniques including:*
(a) clustering or grouping development within areas where there is the least impact on natural character and its elements such as indigenous vegetation, landforms, rivers, streams and wetlands, and coherent natural patterns;
(b) minimising the visual impact of buildings, development, and associated vegetation clearance and earthworks, particularly as seen from public land and the coastal marine area;
(c) providing for, through siting of buildings and development and design of subdivisions, legal public right of access to and use of the foreshore and any esplanade areas;
(d) through siting of buildings and development, design of subdivisions, and provision of access that recognise and provide for the relationship of Maori with their culture, traditions and taonga including concepts of mauri, tapu, mana, wehi and karakia and the important contribution Maori culture makes to the character of the District (refer Chapter 2 and in particular Section 2.5 and Council's "Tangata Whenua Values and Perspectives" (2004);
(e) providing planting of indigenous vegetation in a way that links existing habitats of indigenous fauna and provides the opportunity for the extension, enhancement or creation of habitats for indigenous fauna, including mechanisms to exclude pests;
(f) protecting historic heritage through the siting of buildings and development and design of subdivisions.
(g) achieving hydraulic neutrality and ensuring that natural hazards will not be exacerbated or induced through the siting and design of buildings and development.

S6 matters (National Importance) are addressed later in this report.

In addition:

(a) The proposal will result in one additional dwelling within an area with an existing large lot residential character, in a manner that has little or no impact on natural character, indigenous vegetation, landforms, rivers, streams or wetlands.
(b) The site is not in the coastal environment;
(c) The site does not adjoin any qualifying water body in regard to public access, therefore none is required;
(d) The proposal is not believed to negatively impact on the relationship of Maori with their culture;
(e) There are no existing mapped or identified areas of significant habitat or areas of significant indigenous vegetation, however it is proposed to fence off the central gully;
(f) There are no identified heritage values;
(g) An acceptable stormwater management design forms part of the application; and
(h) Whilst the site is subject to hazard in part, future development can stay clear of, and elevated above that hazard.

I consider the proposal to be consistent with Policy 13.4.13.

13.4.14 That the objectives and policies of the applicable environment and zone and relevant parts of Part 3 of the Plan will be taken into account when considering the intensity, design and layout of any subdivision.

The subdivision has had regard to the underlying zone's objectives and policies.

13.4.15 That conditions be imposed upon the design of subdivision of land to require that the layout and orientation of all new lots and building platforms created include, as appropriate, provisions for achieving the following: (a) development of energy efficient buildings and structures; (b) reduced travel distances and private car usage; (c) encouragement of pedestrian and cycle use; (d) access to alternative transport facilities; (e) domestic or community renewable electricity generation and renewable energy use

The additional lot can readily provide for a house site with good access to sunlight and the ability to utilise energy efficiency measures. The site is close to transport networks.

Policy 13.4.16 is not considered relevant as it only relates to the National Grid.

In summary, I believe the proposal to be consistent with the above Objectives and Policies.

Relevant Rural Production Zone objectives and policies include:

Objectives:

8.6.3.1 To promote the sustainable management of natural and physical resources in the Rural Production Zone.

8.6.3.2 To enable the efficient use and development of the Rural Production Zone in a way that enables people and communities to provide for their social, economic, and cultural well being and for their health and safety.

8.6.3.3 To promote the maintenance and enhancement of the amenity values of the Rural Production Zone to a level that is consistent with the productive intent of the zone.

8.6.3.4 To promote the protection of significant natural values of the Rural Production Zone.

8.6.3.6 To avoid, remedy or mitigate the actual and potential conflicts between new land use activities and existing lawfully established activities (reverse sensitivity) within the Rural Production Zone and on land use activities in neighbouring zones.

8.6.3.7 To avoid remedy or mitigate the adverse effects of incompatible use or development on natural and physical resources.

8.6.3.8 To enable the efficient establishment and operation of activities and services that have a functional need to be located in rural environments.

8.6.3.9 To enable rural production activities to be undertaken in the zone.

And policies

8.6.4.1 That a wide range of activities be allowed in the Rural Production Zone, subject to the need to ensure that any adverse effects on the environment, including any reverse sensitivity effects, on the environment resulting from these activities are avoided, remedied or mitigated and are not to the detriment of rural productivity.

8.6.4.2 That standards be imposed to ensure that the off site effects of activities in the Rural Production Zone are avoided, remedied or mitigated.

8.6.4.3 That land management practices that avoid, remedy or mitigate adverse effects on natural and physical resources be encouraged.

8.6.4.4 That the type, scale and intensity of development allowed shall have regard to the maintenance and enhancement of the amenity values of the Rural Production Zone to a level that is consistent with the productive intent of the zone.

8.6.4.5 That the efficient use and development of physical and natural resources be taken into account in the implementation of the Plan.

8.6.4.7 That although a wide range of activities that promote rural productivity are appropriate in the Rural Production Zone, an underlying goal is to avoid the actual and potential adverse effects of conflicting land use activities.

8.6.4.8 That activities whose adverse effects, including reverse sensitivity effects cannot be avoided remedied or mitigated are given separation from other activities

8.6.4.9 That activities be discouraged from locating where they are sensitive to the effects of or may compromise the continued operation of lawfully established existing activities in the Rural Production zone and in neighbouring zones.

Objective 8.6.3.5 and Policy 8.6.4.6 are not considered relevant as they are solely related to Kerikeri Road.

Refer to Section 6.0 Assessment of Environmental Effects. The proposed subdivision promotes sustainable management and an efficient use and development of the land (Objectives 8.6.3.1 & 8.6.3.2). Amenity values can be maintained (8.6.3.3). I do not believe there will be additional reverse sensitivity effects as a result of the proposal. The site can and will continue to be used for domestic level land based production of some sort. The proposed

development is low density and will not prevent the continued use of nearby land for productive uses where that use currently exists – which is now only the site across the stream (Objectives 8.6.3.6-8.6.3.9 inclusive and Policies 8.6.4.8 and 8.6.4.9).

Policy 8.6.4.7 anticipates a wide range of activities that promote rural productivity, whilst avoiding the actual and potential adverse effects of conflicting land use activities. The proposed subdivision does not affect the ability of lots to continue to provide for use reliant on soils, e.g. domestic level fruit and vegetables. The proposed Lot 2 also has scope for continued small scale limited grazing. I am of the view that the subdivision does not create additional land use incompatibility effects of a minor or more than minor nature.

The proposal provides for sustainable management of natural and physical resources (8.2.4.1). Off site effects can be avoided, remedied or mitigated (8.6.4.2 and 8.6.4.3). Amenity values can be maintained through the size of the lots (open space to built environment ratio) (8.6.4.4). The proposal enables the efficient use and development of natural and physical resources (8.6.4.5).

In summary, I believe the proposal to be more consistent than not with the Rural Production Zone objectives and policies.

7.2 Proposed District Plan

An assessment against the relevant objectives and policies in the Subdivision section of the Proposed District Plan (PDP) follows:

SUB-O1
Subdivision results in the efficient use of land, which:
a. achieves the objectives of each relevant zone, overlays and district wide provisions;
b. contributes to the local character and sense of place;
c. avoids reverse sensitivity issues that would prevent or adversely affect activities already established on land from continuing to operate;
d. avoids land use patterns which would prevent land from achieving the objectives and policies of the zone in which it is located;
e. does not increase risk from natural hazards or risks are mitigates and existing risks reduced; and
f. manages adverse effects on the environment.

The subdivision achieves some of the objectives of the Rural Production Zone, but not all. This is due to the land not actually being productive and already unable to achieve all the objectives of the zone. The proposal contributes to the local character and sense of place. No additional reverse sensitivity effects arise and the land use pattern in the immediate vicinity already renders use of the land for productive purposes unrealistic and impractical. The proposal does not increase the risk from natural hazards because development can occur such that any risks are mitigated. Adverse effects can be managed.

SUB-O2
Subdivision provides for the:
a. Protection of highly productive land; and
b. Protection, restoration or enhancement of Outstanding Natural Features, Outstanding Natural Landscapes, Natural Character of the Coastal Environment, Areas of High Natural Character, Outstanding Natural Character, wetland, lake and river margins, Significant Natural Areas, Sites and Areas of Significance to Māori, and Historic Heritage.

The application site is not 'highly productive land'. The application site does not contain any Outstanding Natural Features, Outstanding Natural Landscapes, or any Areas of High or Outstanding Natural Character. The site is not in the Coastal Environment. The site contains no Significant Natural Areas, no Sites or Areas of Significance to Maori and no Historic Heritage. The site is near the Rangitane Stream, but not immediately adjacent and development can occur without adversely impacting on that stream. There is a gully running through site containing water/ wet areas. This area can be avoided, with adequate setback to ensure no adverse effects as a result of future development.

SUB-O3 *Infrastructure is planned to service the proposed subdivision and development where:*
a. there is existing infrastructure connection, infrastructure should provided in an integrated, efficient, coordinated and future-proofed manner at the time of subdivision; and
b.where no existing connection is available infrastructure should be planned and consideration be given to connections with the wider infrastructure network.

No additional infrastructure is required.

SUB-O4
Subdivision is accessible, connected, and integrated with the surrounding environment and provides for:
a. public open spaces;
b. esplanade where land adjoins the coastal marine area; and
c. esplanade where land adjoins other qualifying water bodies

There is no requirement for public open space or esplanade.

SUB-P1
Enable boundary adjustments that:
….

N/A.

SUB-P2
Enable subdivision for the purpose of public works, infrastructure, reserves or access.

N/A.

SUB-P3
Provide for subdivision where it results in allotments that:
a. are consistent with the purpose, characteristics and qualities of the zone;
b. comply with the minimum allotment sizes for each zone;
c. have an adequate size and appropriate shape to contain a building platform; and
d. have legal and physical access.

The proposal is considered to be consistent with the characteristics and qualities of the zone, in the immediate environs of the application site but perhaps not everywhere in the zone. The fact that the site is not typical, and does not display the attributes, of the Rural Production per se is what sets it aside as being able to be subdivided without threatening the integrity of the zone's objectives and policies. The proposed lots do not comply with the minimum allotment sizes proposed for the zone however these minimum lot sizes are the subject of numerous submissions and cannot be afforded a lot of wait when assessing objectives and policies. The lots are of an appropriate shape and size to contain building platforms; and have legal and physical access.

SUB-P4
Manage subdivision of land as detailed in the district wide, natural environment values, historical and cultural values and hazard and risks sections of the plan

The subdivision has had regard to all the matters listed, where relevant.

SUB-P5
Manage subdivision design and layout in the General Residential, Mixed Use and Settlement zone.....

N/A.

SUB-P6 *Require infrastructure to be provided in an integrated and comprehensive manner by:*
a. demonstrating that the subdivision will be appropriately serviced and integrated with existing and planned infrastructure if available; and
b. ensuring that the infrastructure is provided is in accordance the purpose, characteristics and qualities of the zone.

The additional lots will be reliant on on-site servicing. The site has access to Council roads.

SUB- P7
Require the vesting of esplanade reserves when subdividing land adjoining the coast or other qualifying water bodies.

No Esplanade Reserve is required as the site has no boundary with a qualifying water body.

SUB-P8 *Avoid rural lifestyle subdivision in the Rural Production zone unless the subdivision:*
- *a. will protect a qualifying SNA in perpetuity and result in the SNA being added to the District Plan SNA schedule; and*
- *b. will not result in the loss of versatile soils for primary production activities.*

The proposal is consistent with part (b) as there is no highly productive land involved. It cannot be consistent with part (a) because there is no 'qualifying SNA' and there is no Schedule to add anything to.

SUB-P9
Avoid subdivision [sic] rural lifestyle subdivision in the Rural Production zone and Rural residential subdivision inthe Rural Lifestyle zone unless the development achieves the environmental outcomes required in the management plan subdivision rule.

The subdivision is not a Management Plan.

SUB-P10
To protect amenity and character by avoiding the subdivision of minor residential units from principal residential units where resultant allotments do not comply with minimum allotment size and residential density.

N/A.

SUB-P11
Manage subdivision to address the effects of the activity requiring resource consent including (but not limited to) consideration of the following matters where relevant to the application:
a.consistency with the scale, density, design and character of the environment and purpose of the zone;
b. the location, scale and design of buildings and structures;
c.the adequacy and capacity of available or programmed development infrastructure to accommodate the proposed activity; or the capacity of the site to cater for on-site infrastructure associated with the proposed activity;
d. managing natural hazards;

e. Any adverse effects on areas with historic heritage and cultural values, natural features and landscapes, natural character or indigenous biodiversity values; and
f. any historical, spiritual, or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6.

The above policy is of little relevance as the activity does not require resource consent under the PDP. Notwithstanding that, all of the above have been considered, to the extent considered necessary, in the layout and number of lots being proposed.

In summary I believe the proposed subdivision to be consistent with the PDP's objectives and policies in regard to subdivision.

The site is zoned Rural Production in the Proposed District Plan.

Objectives

RPROZ-O1
The Rural Production zone is managed to ensure its availability for primary production activities and its long-term protection for current and future generations.

RPROZ-O2
The Rural Production zone is used for primary production activities, ancillary activities that support primary production and other compatible activities that have a functional need to be in a rural environment.

RPROZ-O3
Land use and subdivision in the Rural Production zone:
a.protects highly productive land from sterilisation and enables it to be used for more productive forms of primary production;
b.protects primary production activities from reverse sensitivity effects that may constrain their effective and efficient operation;
c.does not compromise the use of land for farming activities, particularly on highly productive land;
d.does not exacerbate any natural hazards; and
e. is able to be serviced by on-site infrastructure.

RPROZ-O4
The rural character and amenity associated with a rural working environment is maintained.

The application site contains no highly productive land. The subdivision maintains rural character and amenity. The development can occur without exacerbating natural hazards and is able to be serviced with on-site infrastructure. RPROZ-O2 is written in a way that appears to exclude residential use, yet zone rules provide for residential use as a permitted activity. This is contradictory in intent. Be that as it may, low density residential use is an accepted and expected feature of the rural zone.

There are no soils on the application site that qualify as 'highly productive land' or 'highly versatile soils' by definition. The proposal is not considered to have minor or more than minor adverse impact on the overall productivity of the soils on the site. The subdivision does not unduly increase any risk of reverse sensitivity and does not compromise the use of the limited amount of nearby land currently used for farming activities.

Policies

RPROZP1
Enable primary production activities, provided they internalise adverse effects onsite where practicable while recognising that typical adverse effects associated with primary production should be anticipated and accepted within the Rural Production zone.

This proposal does not involve an application for a primary production activity.

RPROZP2
Ensure the Rural Production zone provides for activities that require a rural location by:
a. enabling primary production activities as the predominant land use;
b. enabling a range of compatible activities that support primary production activities, including ancillary activities, rural produce manufacturing, rural produce retail, visitor accommodation and home businesses.

Primary production activities are no longer the predominant land use in the immediate vicinity of the site.

RPROZP3
Manage the establishment, design and location of new sensitive activities and other non-productive activities in the Rural Production Zone to avoid where possible, or otherwise mitigate, reverse sensitivity effects on primary production activities.

Reverse sensitivity effects have been discussed elsewhere in this report and it is considered the proposal does not unduly or significantly increase the risk of reverse sensitivity.

RPROZP4
Land use and subdivision activities are undertaken in a manner that maintains or enhances the rural character and amenity of the Rural Production zone, which includes:
a. a predominance of primary production activities;
b. low density development with generally low site coverage of buildings or structures;
c. typical adverse effects such as odour, noise and dust associated with a rural working environment; and
d. a diverse range of rural environments, rural character and amenity values throughout the District.

The immediate area around and including the application site no longer supports primary production activities as the predominant use. The proposal is low density with low site coverage of buildings or structures. I believe the proposal maintains the amenity and character of the area.

RPROZP5
Avoid land use that:
a. is incompatible with the purpose, character and amenity of the Rural Production zone;
b. does not have a functional need to locate in the Rural Production zone and is more appropriately located in another zone;
c. would result in the loss of productive capacity of highly productive land;
d. would exacerbate natural hazards; and
e. cannot provide appropriate on-site infrastructure.

N/A.

RPROZP6
Avoid subdivision that:
a. results in the loss of highly productive land for use by farming activities;
b. fragments land into parcel sizes that are no longer able to support farming activities,taking into account:
1. the type of farming proposed; and
2.whether smaller land parcels can support more productive forms of farming due to the presence of highly productive land.
c. provides for rural lifestyle living unless there is an environmental benefit.

The proposal does not result in the loss of highly productive land. The property is already of size and shape incapable of supporting economically viable farming activities.

RPROZP7
Manage land use and subdivision to address the effects of the activity requiring resource consent, including (but not limited to) consideration of the following matters where relevant to the application:
a. whether the proposal will increase production potential in the zone;
b. whether the activity relies on the productive nature of the soil;
c. consistency with the scale and character of the rural environment;
d. location, scale and design of buildings or structures;
e. for subdivision or non-primary production activities:
i. scale and compatibility with rural activities;
ii. potential reverse sensitivity effects on primary production activities and existing infrastructure;
iii. the potential for loss of highly productive land, land sterilisation or fragmentation
f. at zone interfaces:
i. any setbacks, fencing, screening or landscaping required to address potential conflicts;
ii.the extent to which adverse effects on adjoining or surrounding sites are mitigated and internalised within the site as far as practicable;
g.the capacity of the site to cater for on-site infrastructure associated with the proposed activity, including whether the site has access to a water source such as an irrigation network supply, dam or aquifer;
h. the adequacy of roading infrastructure to service the proposed activity;
i.Any adverse effects on historic heritage and cultural values, natural features and landscapes or indigenous biodiversity;
j.Any historical, spiritual, or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6.

As this application does not require resource consent under the PDP, the policy is of limited relevance. The proposal is of a scale and design that is consistent with the character of the zone and immediate environs. Reverse sensitivity effects are not increased. The site is served by Council roads and can provide for on-site servicing. The site does not exhibit any historic heritage or cultural values and there will be no adverse effects on landscape values, natural character values, or indigenous biodiversity.

7.3 Part 2 Matters

5 Purpose
(1) The purpose of this Act is to promote the sustainable management of natural and physical resources.

(2) In this Act, sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—

(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

(b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and

(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

The proposal provides for peoples' social and economic well being, and for their health and safety, while sustaining the potential of natural and physical resources, safeguarding the life-supporting capacity of air, water, soil and ecosystems; and avoiding, remedying or mitigating adverse effects on the environment.

6 Matters of national importance

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:

(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:

(b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:

(c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:

(d) the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:

(e) the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:

(f) the protection of historic heritage from inappropriate subdivision, use, and development:

(g) the protection of protected customary rights:

(h) the management of significant risks from natural hazards.

The application site is not in the coastal environment and the Rangitane Stream is already afforded both protection and public access by way of an existing marginal strip. The site contains no outstanding landscape or natural features, and no areas of significant indigenous vegetation. The proposal does not impact on the relationship of Maori and their culture and traditions. The site contains no historic heritage and there is no significant risk from natural hazards.

7 Other matters

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to—

(a) kaitiakitanga:

(aa) the ethic of stewardship:

(b) the efficient use and development of natural and physical resources:

(ba) the efficiency of the end use of energy:

(c) the maintenance and enhancement of amenity values:
(d) intrinsic values of ecosystems:
(e) [Repealed]
(f) maintenance and enhancement of the quality of the environment:
(g) any finite characteristics of natural and physical resources:
(h) the protection of the habitat of trout and salmon:
(i) the effects of climate change:
(j) the benefits to be derived from the use and development of renewable energy.

Regard has been had to any relevant parts of Section 7 of the RMA, "Other Matters". These include 7(b), (c), (d) and (f). It is considered that the proposal represents efficient use and development of a site. The low density subdivision will ensure the maintenance of amenity values and the quality of the environment. The proposal has had regard to the values of ecosystems.

8 Treaty of Waitangi
In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

The principles of the Treaty of Waitangi have been considered and it is believed that this proposed subdivision does not offend any of those principles.

In summary, it is considered that all matters under s5-8 inclusive have been adequately taken into account.

7.4 National Policy Statements & Standards

I have not identified any relevant national policy statements or environmental standards.

7.5 Regional Policy Statement for Northland (RPS)

The RPS contains objectives and policies related to infrastructure and regional form and economic development. These are enabling in promoting sustainable management in a way that is attractive for business and investment. The proposal is consistent with these objectives and policies.

The RPS also has policies ensuring that productive land is not subject to fragmentation and/or sterilisation to the point where productive capacity is materially reduced, and that reverse sensitivity effects be avoided, remedied or mitigated.

Objective 3.6 Economic activities – reverse sensitivity and sterilisation

The viability of land and activities important for Northland's economy is protected from the negative impacts of new subdivision, use and development, with particular emphasis on either:

(a) Reverse sensitivity for existing:

(i) Primary production activities; .....

In regard to this subdivision, the RPS defines the productive land it seeks to 'protect' from fragmentation as that land with a LUC class of 1, 2, or 3 (it calls them "highly versatile soils"). The application site contains no such soils. It is considered that no additional reverse sensitivity issues will arise as a result of this proposal because the area around the site is already in residential use with only the rural property across the Rangitane Stream stll being utilised for rural purposes. The proposal does not prevent or threaten the continuation of the use of that land continuing as production use.

The associated Policy to the above Objective is ***Policy 5.1.1 – Planned and coordinated development***.

Subdivision, use and development should be located, designed and built in a planned and co-ordinated manner which: ....

(c) Recognises and addresses potential cumulative effects of subdivision, use, and development, and is based on sufficient information to allow assessment of the potential long-term effects; ...

(e) Should not result in incompatible land uses in close proximity and avoids the potential for reverse sensitivity;

(f) Ensures that plan changes and subdivision to / in a primary production zone, do not materially reduce the potential for soil-based primary production on land with highly versatile soils, or if they do, the net public benefit exceeds the reduced potential for soil-based primary production activities; and ...

Objectives and Policies in the Regional Policy Statement for Northland (RPS) provide direction when examining the subdivision of land in production zones where the soils meet the definition of 'highly versatile' and as stated earlier, the site does not contain any such soils.

5.1.3 Policy – Avoiding the adverse effects of new use(s) and development

Avoid the adverse effects, including reverse sensitivity effects of new subdivision, use and development, particularly residential development on the following:

(a) Primary production activities in primary production zones (including within the coastal marine area);.....

The proposal does not, in my opinion, prevent the continued use of the limited amount of adjacent land still used for production use. Reverse sensitivity effects have been addressed earlier.

I believe the proposal is not contrary to any of the objectives or policies in the Regional Policy Statement for Northland.

7.6 Regional Plans

The subdivision does not result in any breaches of the Regional Plan.

8.0 S 95A-E & CONSULTATION

8.1 S95A Public Notification Assessment

A consent authority must follow the steps set out in s95A to determine whether to publicly notify an application for resource consent. Step 1 specifies when public notification is mandatory in certain circumstances. None of these circumstances exist. Step 2 of s95A specifies the circumstances that preclude public notification. No such circumstance exists. Step 3 of s95A must therefore be considered. This specifies that public notification is required in certain circumstances. No such circumstances exist. The application is not subject to a rule or national environmental standard that requires public notification. This report and AEE concludes that the activity will not have, nor is it likely to have, adverse effects on the environment that are more than minor. In summary public notification is not required pursuant to Step 3 of s95A.

8.2 S95B Limited Notification Assessment

A consent authority must follow the steps set out in s95B to determine whether to give limited notification of an application for a resource consent, if the application is not publicly notified pursuant to s95A. Step 1 identifies certain affected groups and affected persons that must be notified. No affected group of persons as listed in s95B exist in this instance. Step 2 of s95B specifies the circumstances that preclude limited notification. Neither circumstance exists and Step 3 of s95B must be considered. This specifies that certain other affected persons must be notified, specifically:

(7) In the case of a boundary activity, determine in accordance with section 95E whether an owner of an allotment with an infringed boundary is an affected person.

(8) In the case of any other activity, determine whether a person is an affected person in accordance with section 95E.

The application is not for a boundary activity. The s95E assessment below concludes that there are no affected persons to be notified.

8.3 S95D Level of Adverse Effects

The AEE in this report assesses effects on the environment and concludes that these will be no more than minor.

8.4 S95E Affected Persons

A person is an 'affected person' if the consent authority decides that the activity's adverse effects on the person are minor or more than minor (but are not less than minor). A person is not an affected person if they have provided written approval for the proposed activity. Written Approvals have been obtained from the following parties (refer to Appendix 4):

Address	Legal Description	Owners
29 Redcliffs Road	Lot 2 DP 343454	P A & V M Traas
44 River Drive	Lot 6 DP 171115	G Robinson & L E Sims Robinson

Although the activity is a non complying activity, it is of a density and scale that is consistent with the existing density and character of the immediate area. There are residential dwellings to the south, west and north as well as vacant lots yet to be built on of sizes in the 4,000m^2 – 8,000m^2 range. Access is over a jointly owned access lot and private property owned by Redcliffs Properties Limited of which the applicant is one of two directors. Redcliffs Properties Limited also owns Lots 4 & 5 DP 191914 (having shares in the access Lot 6). In effect Redcliffs Properties Limited is co-applicant given that the application involves amalgamation with, and access over, land owned by Redcliffs Properties Limited.

The building site within the vacant lot being proposed is nearest to the Robinson property than any other property and Written Approval has been obtained from that party.

Other than the properties owned by Redcliffs Properties Limited, and the two listed in the table above, I have not identified any affected persons.

The site does not contain any heritage or cultural sites or values and consultation with tangata whenua or Heritage NZ has not been considered necessary prior to lodging this application. Whilst the site adjoins Crown Land, it does already. I do not believe the proposal adversely affects the Department of Conservation's ability to administer the land should they choose to 'administer' it in any way. Neither does the proposal impede public access along the marginal strip. I believe the effects of the proposal on the Department of Conservation, as administrators of adjacent land, to be less than minor.

9.0 SECTION 104D GATEWAY TEST

104D Particular restrictions for non-complying activities

(1) Despite any decision made for the purpose of section 95A(2)(a) in relation to adverse effects, a consent authority may grant a resource consent for a non-complying activity only if it is satisfied that either—

(a) the adverse effects of the activity on the environment (other than any effect to which section 104(3)(a)(ii)applies) will be minor; or

(b) the application is for an activity that will not be contrary to the objectives and policies of—

(i) the relevant plan, if there is a plan but no proposed plan in respect of the activity; or

(ii) the relevant proposed plan, if there is a proposed plan but no relevant plan in respect of the activity; or

(iii) both the relevant plan and the relevant proposed plan, if there is both a plan and a proposed plan in respect of the activity.

In regard to the above, I am of the opinion that the subdivision will achieve a sustainable result and efficient use of the land. I believe that adverse effects on the wider environment will be no more than minor. I believe the proposal to not be contrary to the majority of objectives and policies in the Operative and Proposed Plans. I consider at least one of the arms of the 104D thresholds to be satisfied to enable the granting of this consent.

10.0 CONCLUSION

The site is considered suitable for the proposed subdivision, and effects on the wider environment are no more than minor. There is no District Plan rule or national environmental standard that requires the proposal to be publicly notified.

No special circumstances have been identified that would suggest public notification is required. No affected persons are identified.

I consider the proposal to be more consistent than not with both the Operative and Proposed District Plans' objectives and policies, and to be consistent with the relevant national and regional policy statements and plans, and Part 2 of the Act.

It is requested that the Council give favourable consideration to this application and grant approval, subject to conditions.

Signed Dated 30th March 2026
Lynley Newport
Senior Planner
THOMSON SURVEY LTD

11.0 LIST OF APPENDICES

Appendix 1 Scheme Plan(s)

Appendix 2 Locality Plan

Appendix 3 Records of Title & relevant instruments

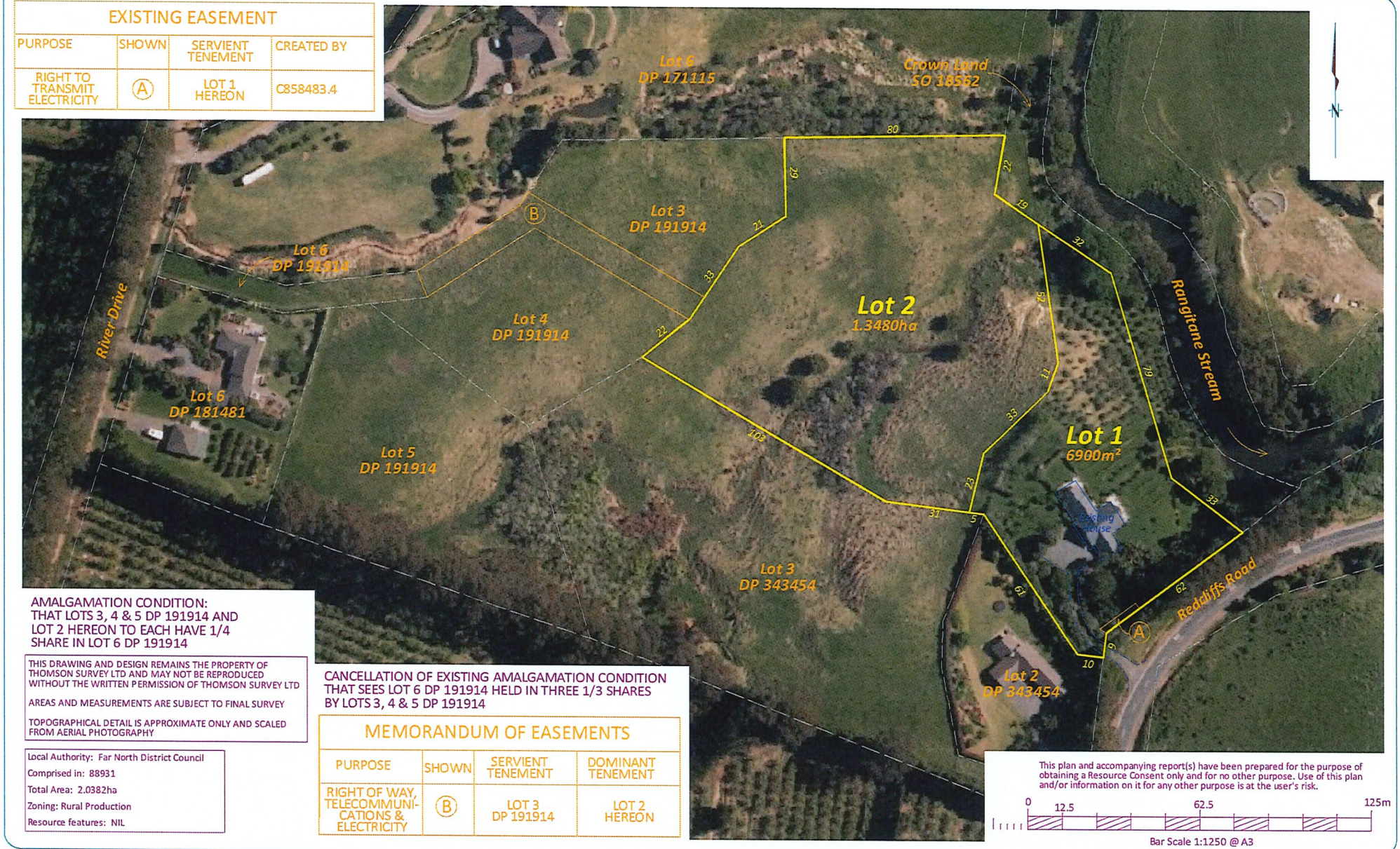
Appendix 4 Written Approvals

Appendix 5 Subdivision Site Suitability Engineering Report

Appendix 1

Scheme Plan(s)

EXISTING EASEMENT			
PURPOSE	SHOWN	SERVIENT TENEMENT	CREATED BY
RIGHT TO TRANSMIT ELECTRICITY	(A)	LOT 1 HEREON	C858483.4



AMALGAMATION CONDITION:
THAT LOTS 3, 4 & 5 DP 191914 AND LOT 2 HEREON TO EACH HAVE 1/4 SHARE IN LOT 6 DP 191914

AREAS AND MEASUREMENTS ARE SUBJECT TO FINAL SURVEY

TOPOGRAPHICAL DETAIL IS APPROXIMATE ONLY AND SCALED FROM AERIAL PHOTOGRAPHY

Local Authority: Far North District Council
Comprised in: 88931
Total Area: 2.0382ha
Zoning: Rural Production
Resource features: NIL

CANCELLATION OF EXISTING AMALGAMATION CONDITION THAT SEES LOT 6 DP 191914 HELD IN THREE 1/3 SHARES BY LOTS 3, 4 & 5 DP 191914

MEMORANDUM OF EASEMENTS			
PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNI-CATIONS & ELECTRICITY	(B)	LOT 3 DP 191914	LOT 2 HEREON

This plan and accompanying report(s) have been prepared for the purpose of obtaining a Resource Consent only and for no other purpose. Use of this plan and/or information on it for any other purpose is at the user's risk.

0 12.5 62.5 125m

Bar Scale 1:1250 @ A3

THOMSON SURVEY LIMITED
315 Kerikeri Rd
P.O. Box 372 Kerikeri
Email: kerikeri@tsurvey.co.nz
Ph: (09) 4077360
www.tsurvey.co.nz
Registered Land Surveyors, Planners & Land Development Consultants

PROPOSED SUBDIVISION OF LOT 1 DP 322274 & EASEMENT OVER LOT 3 DP 191914

33 REDCLIFFS ROAD, KERIKERI

PREPARED FOR: R. AYTON

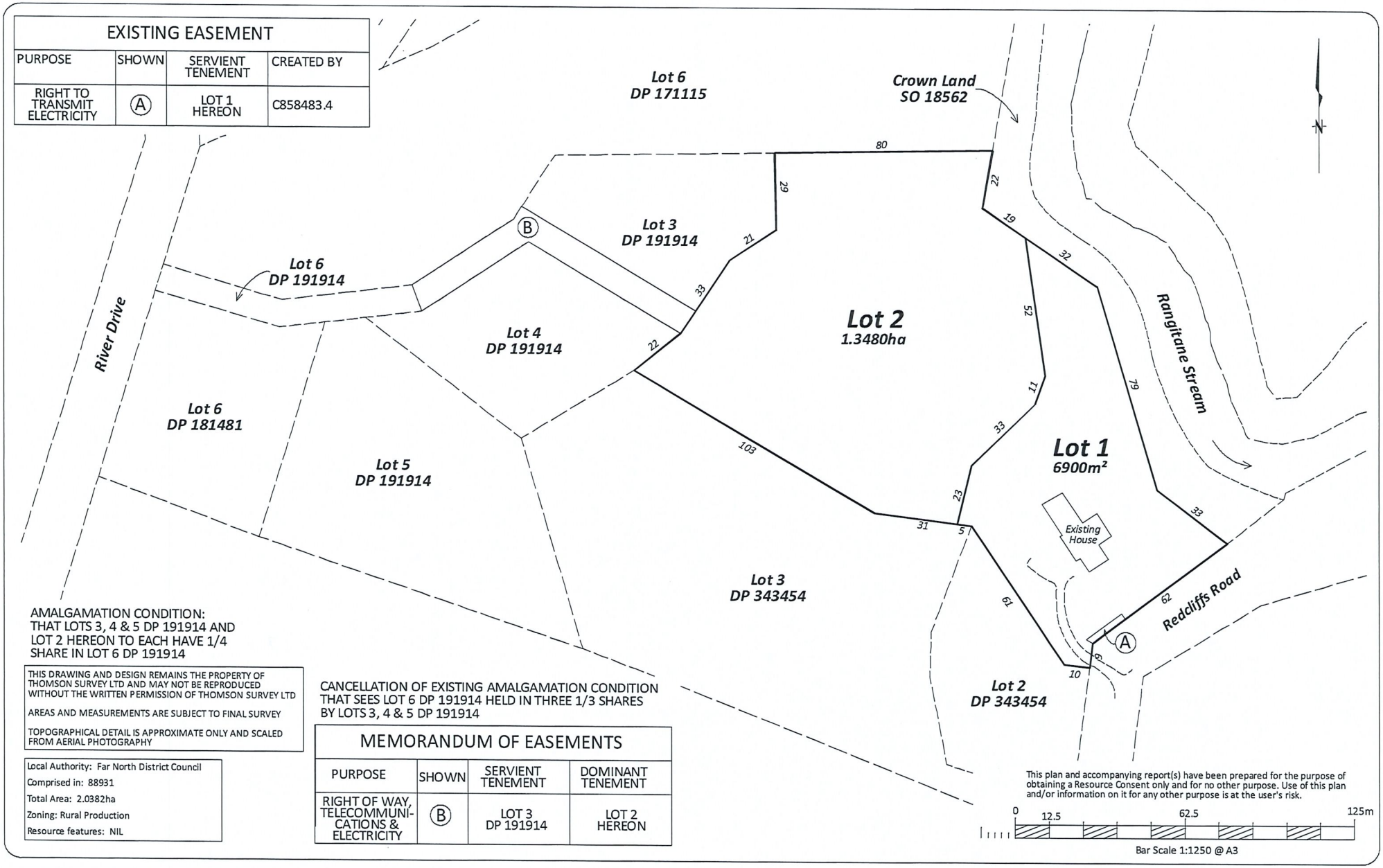
	Name	Date
Survey		
Design		
Drawn	KY	25.03.24
Approved		
Rev	KY	27.08.24

10614 Scheme 20240827

ORIGINAL
SCALE 1:1250
SHEET SIZE A3

Surveyors Ref. No: 10614

Sheet 1 of 1



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Approved		
Rev	KY	27.08.24

10614 Scheme 20240827

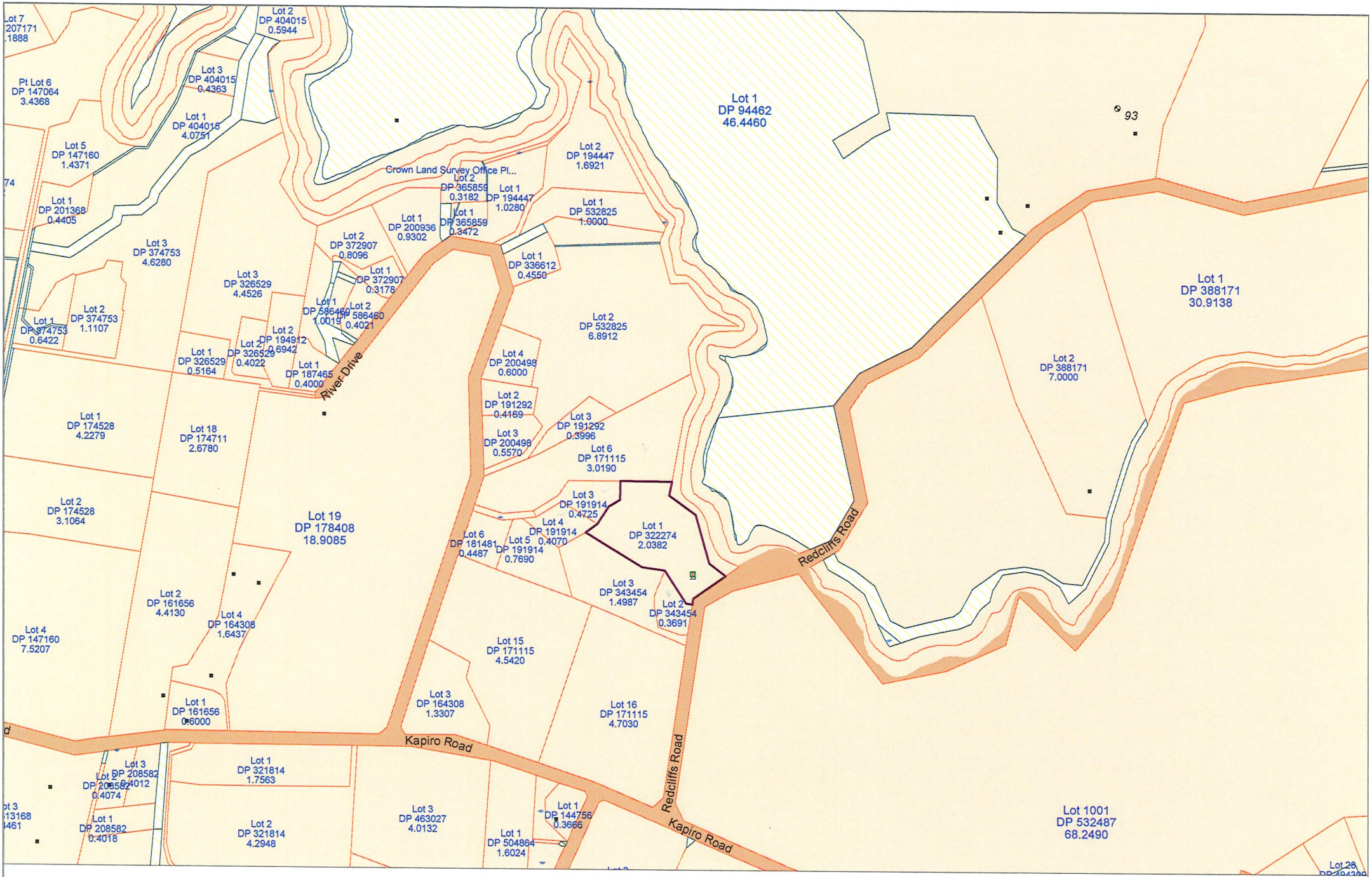
ORIGINAL | SCALE 1:1250 | SHEET SIZE A3

Surveyors Ref. No: 10614

Sheet 1 of 1

Appendix 2

Locality Plan



QuickMap
Custom Software Ltd

0 100 200 300 400 500 600 700 800 900m

Any person wishing to rely on the information shown on this map must independently verify the information

Scale 1:7500 Topographical and Cadastral map derived from LINZ data. Printed: 15-Aug-2024 11:00.

Appendix 3

Records of Title & relevant instruments

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**88931**
Land Registration District	**North Auckland**
Date Issued	19 May 2004

Prior References
NA121D/66 NA121D/67

Estate	Fee Simple
Area	2.0382 hectares more or less
Legal Description	Lot 1 Deposited Plan 322274
Registered Owners	

Deborah Judith Ayton

Interests

Subject to Part IV A Conservation Act 1987

Subject to Section 11 Crown Minerals Act 1991

Appurtenant hereto is an electricity right specified in Easement Certificate C661268.8 - 3.10.1994 at 1.49 pm

The easements specified in Easement Certificate C661268.8 are subject to Section 243 (a) Resource Management Act 1991

Fencing Covenant in Transfer C701839.1 - 18.1.1995 at 1.33 pm (affects part)

Subject to a right to transmit electricity over part marked C on DP 191914 specified in Easement Certificate C858483.4 - 27.6.1995 at 1.55 pm

The easements specified in Easement Certificate C858483.4 are subject to Section 243 (a) Resource Management Act 1991

Appurtenant to part formerly in CT 121D/67 hereto is a right to transmit electricity specified in Easement Certificate C858483.4 - 27.6.1995 at 1.55 pm

Fencing Covenant in Transfer C909047.2 - 17.10.1995 at 2.44 pm (affects part)

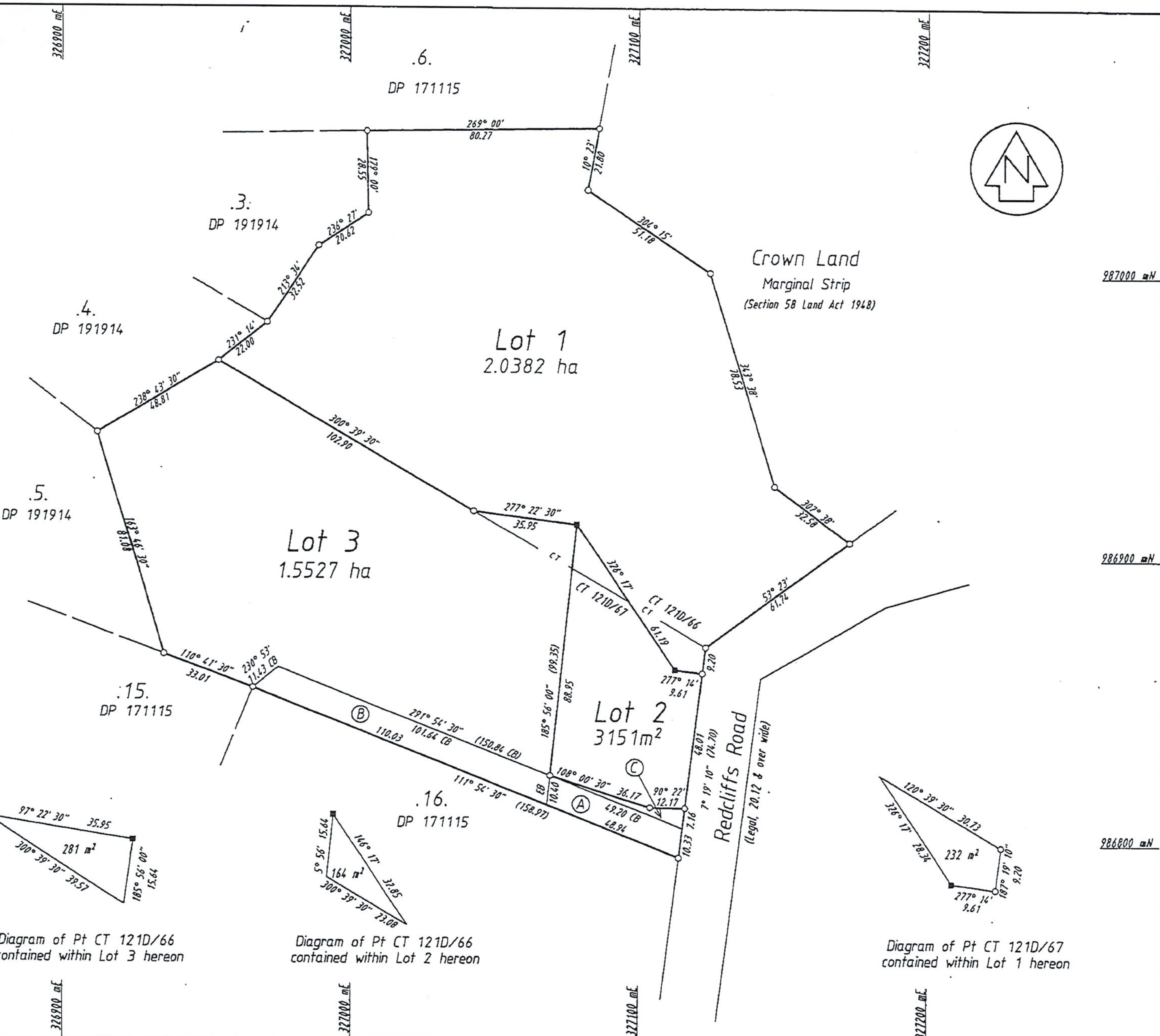
Appurtenant hereto is a right of way specified in Easement Certificate C965805.4 - 11.3.1996 at 3.07 pm (affects part)

The easements specified in Easement Certificate C965805.4 are subject to Section 243 (a) Resource Management Act 1991

D574042.5 Consent Notice pursuant to Section 221(1) Resource Management Act 1991 - 24.1.2001 at 9.00 am

7098229.2 Mortgage to ASB Bank Limited - 3.11.2006 at 2:28 pm

LT 322274 (Title Plan)
Cpy-01/01,Pgs-001,08/06/03,09:48
DocID: 310858957



Approvals

I hereby certify that this plan was approved by the Far North District Council pursuant to Section 223 of the Resource Management Act 1991 on the 23rd day of April 2003 subject to the granting or reserving of the easements set out in the Memorandum endorsed hereon

P.J. Killalea
Authorised Officer
RC 2030170

MEMORANDUM OF EASEMENTS

Purpose	Serrient Tenement	Shown	Dominant Tenement
Right of Way Right to transmit Electricity Right to transmit Telecommunications Right to supply water	LOT 3	(A) (C)	LOT 2

Areas marked (A) (B) are subject to existing Land Covenants (building restriction) D574042.5

CLASS OF SURVEY : II

New CT Allocated
Lot 1 : 88931
Lot 2 : 88932
Lot 3 : 88933

Subject to Part IVA Conservation Act 1987

Total Area 3.9060 ha

Comprised in
CT's 121D/66 (all), 121D/67 (all)

I, Robert John Donaldson of Kerikeri, Registered Surveyor, certify that :
a) The surveys to which this dataset relates are accurate, and were undertaken by me or under my direction in accordance with the Survey Act 1986 and the Survey Regulations 1998:
b) This dataset is accurate and has been created in accordance with that Act and those Regulations.

Dated at KERIKERI this 14th day of April 2003
Signature

Field Book .... p .../.. Traverse Book ...... p .....
Reference Plans ....
Examined .... Correct ....

Approved as to Survey by Land Information NZ on
5 / 6 / 2003

Deposited by Land Information NZ on
19 / 5 / 2004

File
Received 0 8 MAY 2003

DP 322274

LAND DISTRICT	NORTH AUCKLAND

Lots 1 - 3 being a subdivision of
Lots 1 & 2 DP 191914

TERRITORIAL AUTHORITY FAR NORTH DISTRICT
Surveyed by R. J. DONALDSON & ASSOCIATES Ref. 4164
Scale 1 : 1000 Date March 2003

C858483.4
EC

Approved by the District Land Registrar, South Auckland No. 351560
Approved by the District Land Registrar, North Auckland, No. 4380/81
Approved by the Registrar-General of Land, Wellington, No. 436748.1/81

EASEMENT CERTIFICATE

(IMPORTANT: Registration of this certificate does not of itself create any of the easements specified herein).

~~I/We~~ KERIFRESH LIMITED at Kerikeri

being the registered proprietor(s) of the land described in the Schedule hereto hereby certify that the easements specified in that Schedule, the servient tenements in relation to which are shown on a plan of survey deposited in the Land Registry Office at Auckland on the day of 1995 under No. 164308 are the easements which it is intended shall be created by the operation of section 90A of the Land Transfer Act 1952.

SCHEDULE

DEPOSITED PLAN NO. 164308

Nature of Easement (e.g., Right of Way, etc.)	Servient Tenement		Dominant Tenement Lot No.(s) or other Legal Description	Title Reference
	Lot No.(s) or other Legal Description	Colour, or Other Means of Identification, of Part Subject to Easement		
Right of Way Right to Convey Water Right to Transmit Electricity and Telecommunications	LOT 6 hereon	A, B and C	LOT 5 hereon	99A/307 99A/306
Right to Transmit Electricity	LOT 1 hereon	F	LOT 2 hereon	99A/302 99A/303

State whether any rights or powers set out here are in addition to or in substitution for those set out in the Seventh Schedule to the Land Transfer Act 1952.

1. Rights and powers: See attached

2. Terms, conditions, covenants, or restrictions in respect of any of the above easements:
See attached

Dated this 23rd day of June 1995

Signed by the above-named
KERIFRESH LIMITED

in the presence of

Witness .....

Occupation .....

Address .....

KERIFRESH LIMITED
The Common Seal of

RIGHTS AND POWERS

That in respect of the Telecommunications and Electricity Easements referred to in the Schedule hereto, the rights and powers applicable thereto are:

(a) The full free uninterrupted and unrestricted right liberty and privilege for the occupier and registered proprietor for the time being of the dominant tenement from time to time and at all times to take convey and lead electrical current or any other mode of transmitting telecommunications in a free and unimpeded flow (except where the flow is halted for any reasonable period necessary for essential repairs) for the purposes of telecommunications across the land over which the Easement is created and to lay and maintain cables for such purpose.

(b) The full free uninterrupted and unrestricted right liberty and privilege for the occupier and registered proprietor for the time being of the dominant tenement from time to time and at all times to take convey and lead electricity in a free and unimpeded flow (except where the flow is halted for any reasonable period necessary for essential repairs) across the land over which the Easement is created and to lay and maintain cables for such purpose.

TERMS CONDITIONS COVENANTS OR RESTRICTIONS IN RESPECT OF ABOVE EASEMENTS:

That in respect of the Electricity and Telecommunications Easements (hereinafter called "the Easements") referred to in the Schedule hereto the terms conditions covenants or restrictions applicable thereto are as follows:-

(a) All cables placed within or such poles and cable erected upon the servient tenements shall be maintained and as required repaired to a good and serviceable condition by the registered proprietors for the time being of the dominant tenements.

(b) All the costs and expenses of and incidental to the repairing and maintaining of the Easements herein specified shall be borne by the registered proprietor for the time being of the dominant tenements.

(c) Any person wishing to carry out any work whatsoever on the Easements herein specified shall first give to the registered proprietor of the servient tenement thereof notice of such intention and of the nature and expense of the said work at least fourteen (14) days prior to any such work being commenced and shall obtain the prior consent in writing of the registered proprietor of the servient tenement provided that such consent shall not be unreasonably nor arbitrarily withheld.

(d) Any person carrying out any work whatsoever on the Easements herein specified shall take all reasonable and proper action and care to interfere as little as possible with the comfort and convenience of the occupier or occupiers for the time being of the dominant and servient tenements and shall carry out such work or cause the same to be carried out with the utmost expedition and in a prudent manner and in particular shall during the course of such work:

(i) Shore up or cause to be shored up in a proper safe and workmanlike manner any part of the dominant or servient tenement affected thereby.

(ii) Take all reasonable and proper steps to preserve the said tenements and all parts thereof and all property and goods thereon from damage.

(e) Subject to the other terms and conditions covenants and restrictions contained in these presents any person carrying out any work as aforesaid shall have the right to enter and to bring machinery and workmen on to any part of the dominant or servient tenement as shall be necessary for the purposes of carrying out maintenance on the Easements referred to herein and shall have the right to remove all soil roading paving metalling fencing and all other things as shall be reasonably necessary to give unimpeded access to the said Easement PROVIDED HOWEVER that such soil roading paving metalling and fencing which is so removed shall be restored as nearly as possible to its original condition and that any other damage done by reason of the said maintenance is repaired and that as little disturbance as possible is caused to the surface of the land and to the

enjoyment of the said tenements by the registered proprietors or occupiers.

(f) Where the maintenance work which is required to be carried out in terms of these presents involves the total or partial replacement of any cables this work shall be deemed to be maintenance work which may be carried out in accordance with these presents.

0.25

REGISTERED IN DUPLICATE

EASEMENT CERTIFICATE

(IMPORTANT): Registration of this certificate does not of itself create any of the easements specified herein.

Correct for the purposes of the Land Transfer Act

Solicitor for the registered proprietor

PARTICULARS ENTERED IN REGISTER
LAND REGISTRY AUCKLAND
ASST. DISTRICT REGISTRAR

1.55 27.JUN95 C 858483.4(f)

LAW NORTH PARTNERS
SOLICITORS
KERIKERI

D5740425 COND

FAR NORTH DISTRICT COUNCIL

THE RESOURCE MANAGEMENT ACT 1991

SECTION 221 : CONSENT NOTICE

REGARDING The subdivision of
Lots1&2 DP 164308 and Lot 5 DP 171115
North Auckland Registry.

PURSUANT to Section 221 for the purposes of Section 224 of the Resource Management Act 1991, this Consent Notice is issued by the FAR NORTH DISTRICT COUNCIL to the effect that conditions described in the schedule below are to be complied with on a continuing basis by the subdividing owner and the subsequent owners after the deposit of the survey plan, and is to be registered on DP 191914

SCHEDULE

1. All proposed buildings are to be finished in recessive colours compatible with the surrounding environs.
2. No buildings are to be constructed within the areas marked X, Y , Z as shown on the submitted plan.
3. The operation of agricultural and horticultural equipment including sprays and chemicals (subject to compliance with any relevant legislation) may be a permitted activity. Accordingly, where rainwater is collected from exposed surfaces for human consumption in connection with any residential development on the site, the occupiers of any such dwelling shall install an approved water filtration system.
4. That the number of units per site able to be used for living purposes be limited to one per site.

SIGNED: P.J. Killalea

by the FAR NORTH DISTRICT COUNCIL
under delegated authority:
ENVIRONMENTAL SERVICES MANAGER

DATED at **KAIKOHE** this 6th day of October 1999.

ALL CST

RC 1970080

SRM\CERT\redcliffs221

LINZ COPY

9.00 24.JAN01 D 574042 :5

PARTICULARS ENTERED IN THE
LAND REGISTER NO 11
for REGISTRAR-GENERAL OF LAND

REGISTRAR-GENERAL OF LAND NEW ZEALAND

cono

99A/302-3
1150/225

↓

20 mm c.s T

Appendix 4

Written Approvals

Far North District Council

NOTICE OF WRITTEN APPROVAL

Written Approval of Affected Parties in accordance with Section 95E of the Resource Management Act

PART A – To be completed by Applicant

Applicant/s Name:	Richard Ayton
Address of proposed activity:	33 Redcliffs Road
Legal description:	Lot 1 DP 322274
Description of the proposal (including why you need resource consent):	Subdivision of land zoned Rural Production, into two lots (one additional), as a non complying activity under the Operative District Plan; ROW over Lot 3 DP 191914.
Details of the application are given in the attached documents & plans (list what documents & plans have been provided to the party being asked to provide written approval):	1. Attached scheme plans dated 27.08.24 2. _____ 3. _____ 4. _____ 5. _____ 6. _____

Notes to Applicant:

1. Written approval must be obtained from all registered owners and occupiers.
2. The **original copy** of this signed form and **signed plans and accompanying documents** must be supplied to the Far North District Council.
3. The amount and type of information provided to the party from whom you seek written approval should be sufficient to give them a full understanding of your proposal, its effects and why resource consent is needed.

PART B – To be completed by Parties giving approval

Notes to the party giving written approval:

1. If the owner and the occupier of your property are different people then separate written approvals are required from each.
2. You should only sign in the place provided on this form and accompanying plans and documents if you **fully understand** the proposal and if you **support** or have **no opposition** to the proposal. Council will not accept conditional approvals. If you have conditions on your approval, these should be discussed and resolved with the applicant directly.
3. Please note that when you give your written approval to an application, council cannot take into consideration any actual or potential effects of the proposed activity on you unless you formally withdraw your written approval **before** a decision has been made as to whether the application is to be notified or not. After that time you can no longer withdraw your written approval.
4. Please sign and date all associated plans and documentation as referenced overleaf and return with this form.
5. If you have any concerns about giving your written approval or need help understanding this process, please feel free to contact the duty planner on 0800 920 029 or (09) 401 5200.

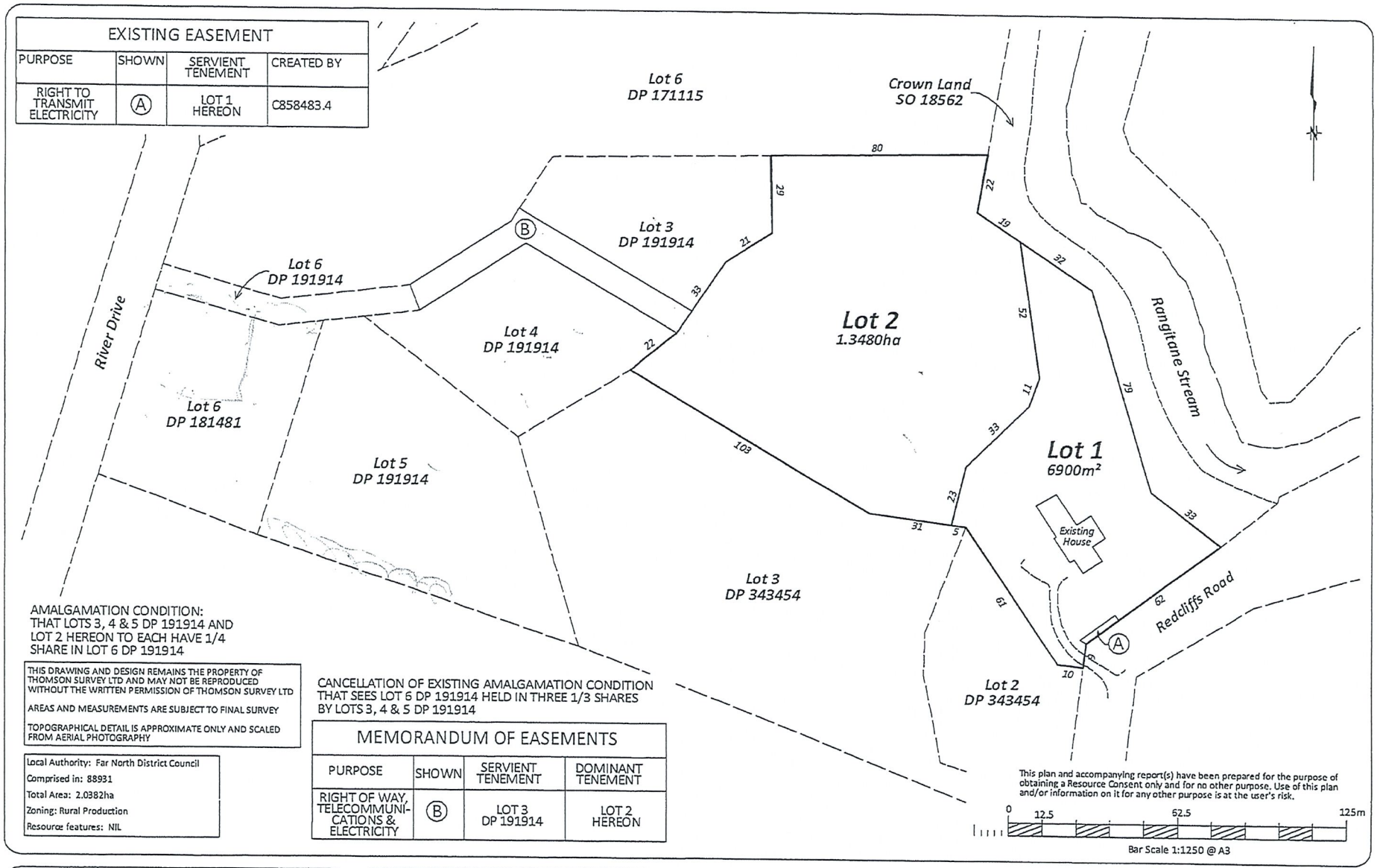
Full name/s of party giving approval:	GLYN ROBINSON LESLEY ROBINSON
Address of affected property including legal description	42, RIVER DRIVE RD. RD1, KERIKERI 0294, NORTHLAND.
Contact Phone Number/s and email address	Daytime: 021 109 1918 email: lesrobinsonnz@gmail.com.

I am/we are the OWNER(S) / OCCUPIER(S) of the property (circle which is applicable)

*Please note: in most instances the approval of **all** the legal owners and the occupiers of the affected property will be necessary.*

1. I/We have been provided with the details concerning the application submitted to Council and understand the proposal and aspects of non-compliance with the Operative District Plan.
2. I/We have signed each page of the plans and documentation in respect of this proposal (these need to accompany this form).
3. I/We understand and accept that once I/we give my/our approval the Consent Authority (Council) cannot take account of any actual or potential effect of the activity and/or proposal upon me/us when considering the application and the fact that any such effect may occur shall not be relevant grounds upon which the Consent Authority may refuse to grant the application.
4. I/We understand that at any time before the notification decision is made on the application, I/we may give notice in writing to Council that this approval is withdrawn.

Signature		Date	10/9/2025
Signature		Date	10/9/2025
Signature		Date	
Signature		Date	



THOMSON SURVEY LIMITED
315 Kerikeri Rd
P.O. Box 372 Kerikeri
Email: kerikeri@tsurvey.co.nz
Ph: (09) 4077360
www.tsurvey.co.nz
Registered Land Surveyors, Planners & Land Development Consultants

PROPOSED SUBDIVISION OF LOT 1 DP 322274 & EASEMENT OVER LOT 3 DP 191914

33 REDCLIFFS ROAD, KERIKERI

PREPARED FOR: R. AYTON

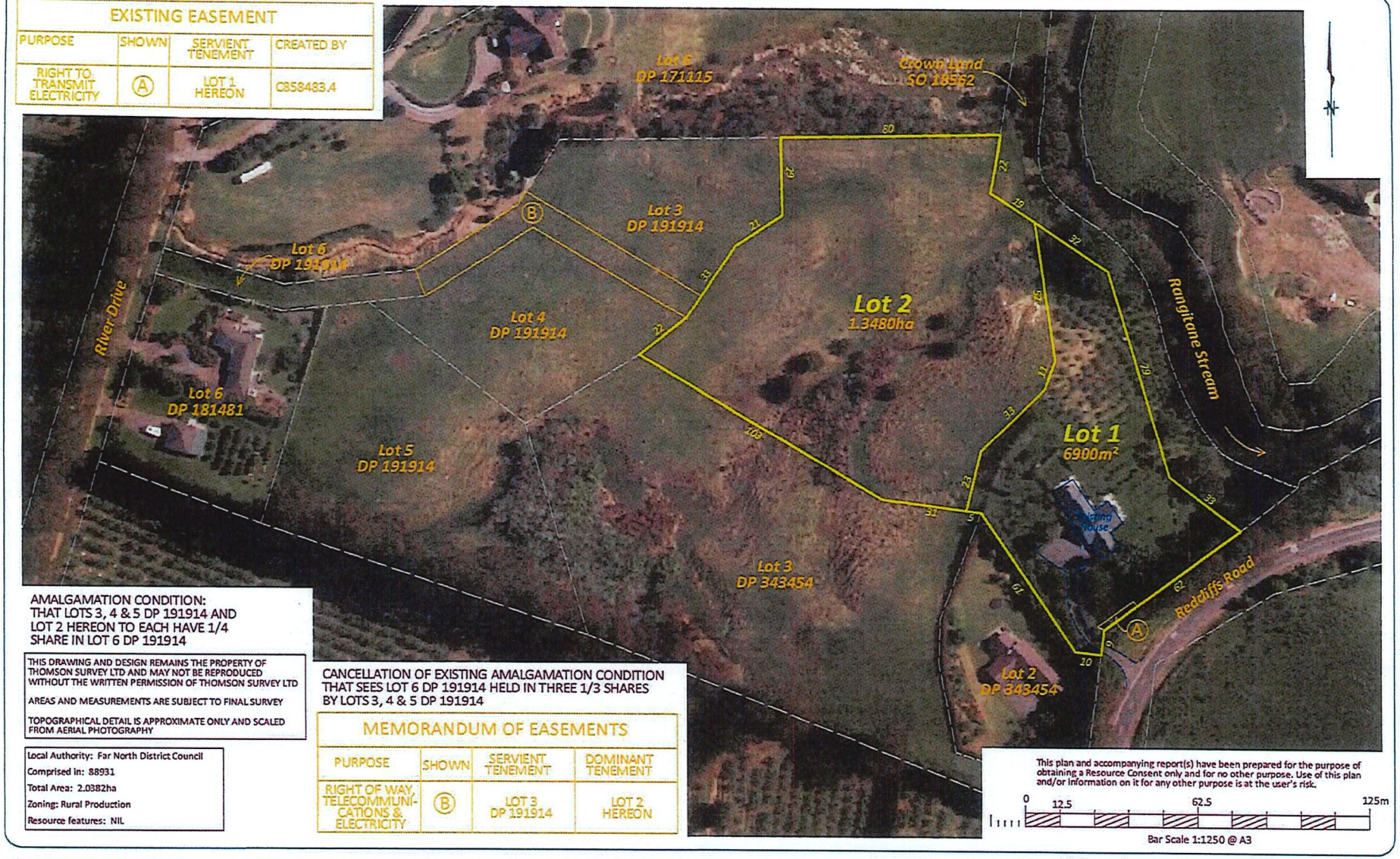
	Name	Date
Survey		
Design		
Drawn	KY	25.03.24
Approved		
Rev	KY	27.08.24

10614 Scheme 20240827

ORIGINAL
SCALE 1:1250
SHEET SIZE A3

Surveyors Ref. No: 10614

Sheet 1 of 1



EXISTING EASEMENT			
PURPOSE	SHOWN	SERVIENT TENEMENT	CREATED BY
RIGHT TO TRANSMIT ELECTRICITY	(A)	LOT 1 HEREON	C858483.4

AMALGAMATION CONDITION:
THAT LOTS 3, 4 & 5 DP 191914 AND LOT 2 HEREON TO EACH HAVE 1/4 SHARE IN LOT 6 DP 191914

AREAS AND MEASUREMENTS ARE SUBJECT TO FINAL SURVEY

TOPOGRAPHICAL DETAIL IS APPROXIMATE ONLY AND SCALED FROM AERIAL PHOTOGRAPHY

Local Authority: Far North District Council
Comprised in: 88931
Total Area: 2.0382ha
Zoning: Rural Production
Resource features: NIL

CANCELLATION OF EXISTING AMALGAMATION CONDITION
THAT SEES LOT 6 DP 191914 HELD IN THREE 1/3 SHARES BY LOTS 3, 4 & 5 DP 191914

MEMORANDUM OF EASEMENTS			
PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNICATIONS & ELECTRICITY	(B)	LOT 3 DP 191914	LOT 2 HEREON

0 12.5 62.5 125m

Bar Scale 1:1250 @ A3

THOMSON SURVEY LIMITED
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33 REDCLIFFS ROAD, KERIKERI

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Drawn	KY	25.03.24
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Rev	KY	27.08.24

10614 Scheme 20240827

ORIGINAL
SCALE 1:1250
SHEET SIZE A3

Surveyors Ref. No: 10614

Sheet 1 of 1

Far North District Council

NOTICE OF WRITTEN APPROVAL

Written Approval of Affected Parties in accordance with Section 95E of the Resource Management Act

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Address of proposed activity:	33 Redcliffs Road
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Details of the application are given in the attached documents & plans (list what documents & plans have been provided to the party being asked to provide written approval):	1. Attached scheme plans dated 27.08.24 2. 3. 4. 5. 6.

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4. Please sign and date all associated plans and documentation as referenced overleaf and return with this form.
5. If you have any concerns about giving your written approval or need help understanding this process, please feel free to contact the duty planner on 0800 920 029 or (09) 401 5200.

Full name/s of party giving approval:	Victoria Margaret Traas
Address of affected property including legal description	29 Redcliffs Road, Kerikeri
Contact Phone Number/s and email address	Daytime: 0210794424 email: vtraas@kerikerihigh.ac.nz

I am/we are the OWNER(S) / OCCUPIER(S) of the property (circle which is applicable)

*Please note: in most instances the approval of **all** the legal owners and the occupiers of the affected property will be necessary.*

1. I/We have been provided with the details concerning the application submitted to Council and understand the proposal and aspects of non-compliance with the Operative District Plan.
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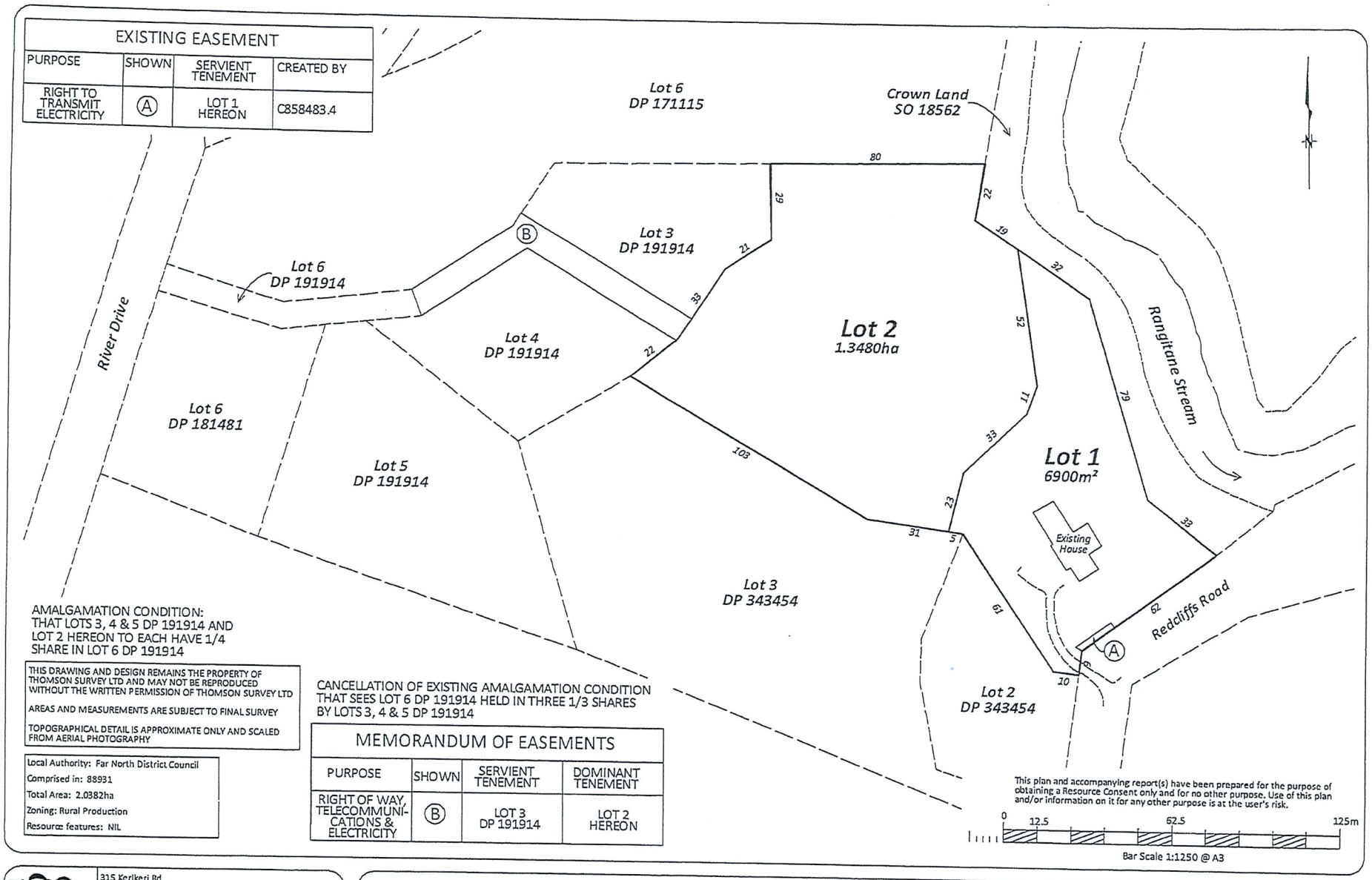
4. I/We understand that at any time before the notification decision is made on the application, I/we may give notice in writing to Council that this approval is withdrawn.

Signature	[signature]	Date	11/9/2025
Signature		Date	
Signature		Date	
Signature		Date	



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PROPOSED SUBDIVISION OF LOT 1 DP 322274 & EASEMENT OVER LOT 3 DP 191914

33 REDCLIFFS ROAD, KERIKERI

PREPARED FOR: R. AYTON

	Name	Date
Survey		
Design		
Drawn	KY	25.03.24
Approved		
Rev	KY	27.08.24

10614 Scheme 20240827

ORIGINAL
SCALE 1:1250
SHEET SIZE A3

Surveyors Ref. No: 10614

Sheet 1 of 1

Appendix 5

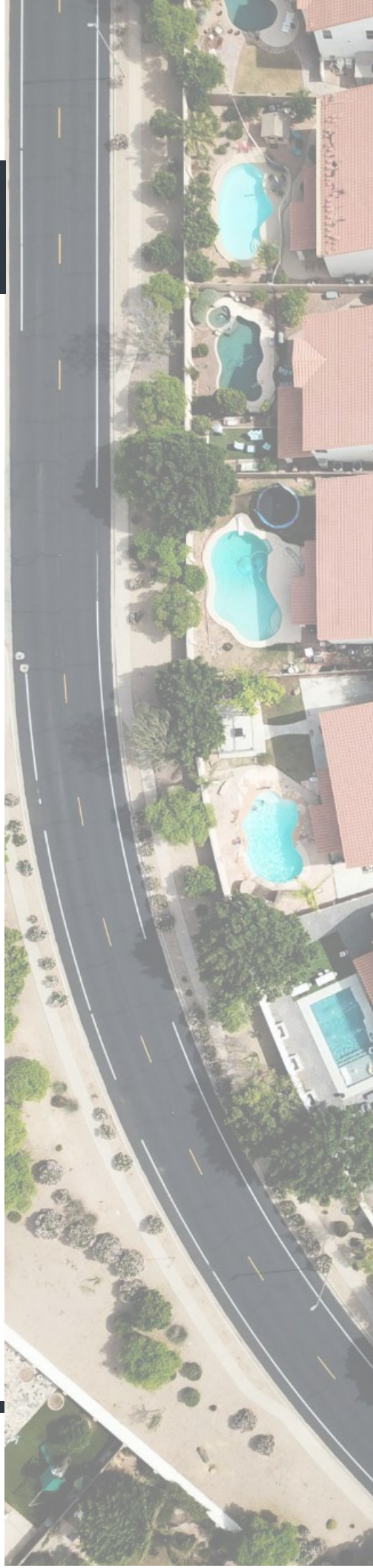
Subdivision Site Suitability Engineering Report

geologix
consulting engineers

SUBDIVISION SITE SUITABILITY ENGINEERING REPORT

33 REDCLIFFS ROAD, LOT 1 DP 322274, KERIKERI

RICHARD AYTON



C0492-S-01-R01
AUGUST 2024
REVISION 1

geologix
consulting engineers

DOCUMENT MANAGEMENT

Document Title	Subdivision Site Suitability Engineering Report
Site Reference	33 Redcliffs Road, Kerikeri
Client	Richard Ayton
Geologix Reference	C0492-S-01-R01
Issue Date	August 2024
Revision	01
Prepared	Sander Derks Graduate Civil Engineer, Dip. Eng 
Reviewed	Sebastian Hicks Principal Civil Engineer, CPEng Reg. 1168062, CMEngNZ, IntPE(NZ) /APEC Engineer 
Approved	Edward Collings Managing Director, CEnvP Reg. 0861, CPEng Reg. 1033153, CMEngNZ 
File Reference	*Z:\Projects\C0400-C0499\33 Redcliffs Road, Kerikeri - C0492\06 - Reports\C0492-S-01-R01.docx*

REVISION HISTORY

Date	Issue	Prepared	Reviewed	Approved
August 2024	First Issue	SD	SH	EC

geologix
consulting engineers

TABLE OF CONTENTS

TABLES

1 INTRODUCTION

This Site Suitability Engineering Report has been prepared by Geologix Consulting Engineers Ltd (Geologix) for Richard Ayton as our Client in accordance with our standard short form agreement and general terms and conditions of engagement.

Our scope of works has been undertaken to assist with the Resource Consent application in relation to the proposed subdivision of a rural property (Lot 1 DP 322274) located at 33 Redcliffs Road, Kerikeri, the 'site'. Specifically, this assessment addresses engineering elements of natural hazards, wastewater, stormwater, internal roading and associated earthworks requirements to provide safe and stable building platforms with less than minor effects on the environment as a result of the proposed activities outlined in Section 1.1.

1.1 Proposal

A proposed scheme plan was presented to Geologix at the time of writing, prepared by Thomson Survey[1] and has been reproduced within Appendix A as Drawing No 100. It is understood that the Client proposes to subdivide the site into two separate lots comprising of the existing residential dwelling (proposed Lot 1) and a new residential lot (proposed Lot 2). This is summarised in Table 1. Any amendments to the referenced scheme plan may require an update to the recommendations of this report which are based on conservative, typical rural residential development concepts.

The site is located in the rural production zone as per the FNDC Operative District Plan.

Table 1: Summary of Proposed Subdivision

Proposed Lot No.	Size	Purpose
1	0.6900 ha	New residential Lot (Contains existing dwelling)
2	1.3480 ha	New residential Lot

Site access for proposed Lot 1 with the existing dwelling will remain the same and be provided off Redcliffs Road. Site access to Lot 2 will be provided off River Drive, over Lot 6 and then Lot 3 of DP 191914. Vehicle crossing location for River Drive has been considered with a safety aspect in relation to visibility of incoming and outgoing vehicle movements. However, a specific Traffic Impact Assessment (TIA) is not within the scope of this report.

2 DESKTOP APPRAISAL

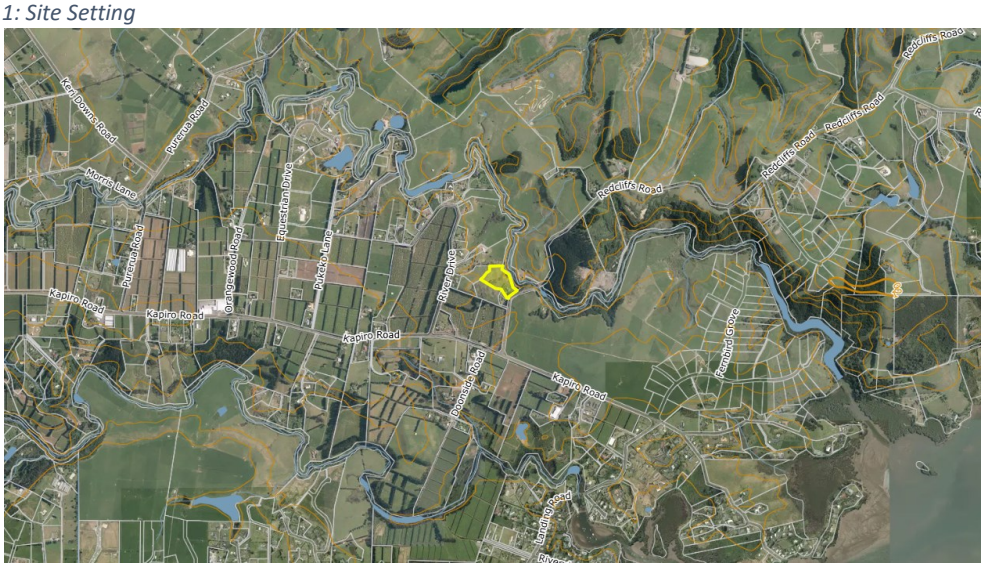
The site is located on the northwestern side of Redcliffs Road which routes perpendicular from Kapiro Road approximately 340 m bearing south. The site is irregular in shape and is bound by a Marginal Strip which separates the site from Rangitane Stream to the east. An existing residential development is positioned adjacent to the southeastern boundaries, with the subdivision proposing to divide the property into unequal separate lots. Surrounding properties depict similar rural agricultural lands in all directions. Topographically, majority of the developed portion of the site with the existing dwelling is landscaped and flat, while from

[1] *Thompson Survey, Scheme Plan Ref. 10614, dated 25 March 2024.*

the proposed dividing boundary veering north, a notable depression is part of an overland flow path leading towards Rangitane Stream. Beyond the low-lying feature presenting central within proposed Lot 2, the rest of the site elevates with a more moderate slope to where it gradually becomes a gentle slope beyond the proposed access point at River Drive.

The site setting is presented schematically as Figure 1 below.

Figure 1: Site Setting



The site area is currently in use for rural residential and agricultural purpose, depicting rough grass with vegetation, watercourses, and existing buildings that will remain on proposed Lot 1. A detailed review of the existing watercourses and overland flow paths is presented in Section 3. In brief, the site is intersected by multiple small ditches, detaining small pockets of water as it extends and terminates at the western boundary into Rangitane Stream.

2.1 Existing Reticulated Networks

Far North District Council (FNDC) GIS mapping indicates that no existing public three waters infrastructure or reticulated networks are present within Redcliffs Road or the site boundaries. This report has been prepared with the goal of the subdivision and future development being self-sufficient for the provisions of wastewater, stormwater, and potable water management.

2.2 Geological Setting

Available geological mapping[2] indicates the site to be underlain by basalt lava flows of the Kerikeri Volcanics Group which occupies the wider Kerikeri area. The unit is typically consistent in nature across the local area and is commonly weathered to clay and silt residual

[2] *Edbrooke, S.E, 2001. Geology of the Auckland area. Institute of Geological & Nuclear Sciences 1:250 000 geological map 3.*

soils. The geological mapping describes the strata as basalt lava flows with older flows and flow remnants.

With the Rangitane Stream located nearby, some weaker alluvial soils may be present.

2.3 Existing Geotechnical Information

Existing ground investigations were not made available to Geologix at the time of writing. Furthermore, a review of available GIS databases, including the New Zealand Geotechnical Database,[3] did not indicate borehole records within 500 m of the site.

3 SURFACE WATER FEATURES AND OVERLAND FLOWPATHS

During our site walkover and desktop appraisal of GIS topographic data, Geologix have developed an understanding of the surface water features and overland flow paths influencing the site. This is summarised in the following sections and shown schematically on Drawing No. 100 (Appendix A) with associated off-set requirements to hydrological features.

3.1 Stormwater Catchment and Flood Hazards

The site is positioned at the lower elevations of a catchment that lies on the edge of the Kerikeri Volcanic geological boundary, bound by two ridge lines to the east and west converging at Rangitane Stream where the catchment ultimately discharges to before terminating in the Kerikeri Inlet.

The site catchment areas begin beyond the west and southwestern boundary towards River Drive and Kapiro Road by the natural hill that crests at each side of a potential wetland feature meandering from the southwest. A second catchment appears to flow north along the northern boundaries of the larger subdivision that supports the catchment from the northern neighbouring site.

There is a mapped flood hazard on this low-lying wetland area. The mapped flood undulation is limited to proposed Lot 2, entering on the eastern boundary partially encroaching into the site.

Rangitane Stream also displays mapped flood hazards that affect properties either side of the watercourse.

3.2 Surface Water Features

Some naturally defined overland flow paths are evident within the site boundaries upon moderately sloping land, on both the northern and southern aspects concentrating toward the central lower elevations of the site. There is one predominant and one minor flow path that each lie within the two catchments defined in Section 3.1 above. The overland flow path on the neighbouring site looks to have been constructed and appears well maintained comprising of planting and a stormwater detention pond that is positioned within the site.

[3] https://www.nzgd.org.nz/

There is existing private stormwater infrastructure that has been constructed prior to this proposed development plan. This includes existing stormwater tanks and a well-defined swale drain located along the western boundary of proposed Lot 1. This swale drain discharges to the Rangitane Stream neighbouring the site.

Our walkover survey was undertaken in late May during a relatively typical period of weather, generally fine with sporadic light rain events, and noted no visible flows through the overland flow paths.

There are no proposed wastewater treatment or dispersion fields near to any overland flow path and meet offset requirements.

The above information is presented on Drawing No. 100 within Appendix A.

4 GROUND INVESTIGATION

A site-specific walkover survey and intrusive ground investigation was undertaken by Geologix on 22 May 2024. The ground investigation was scoped to confirm the desktop assessment findings (where possible) and to provide parameters for the wastewater assessment. The ground investigation comprised the following:

- One hand augered borehole designated BH01 formed at the proposed building site with a target depth of 5.0 m below ground level (bgl). Auger terminated prior to this depth at 1.5 m. The borehole was extended with a scala penetrometer probe to confirm the presence of dense material proving more than 20 blows/ 100 mm. This strata (dense material) was identified at a depth of 4.3 m and is considered to approximate weathered rock.
- One hand augered borehole designated BH02 formed within a suitable area for the wastewater disposal fields within the proposed residential lot with a target depth of 1.2 m below ground level (bgl).

4.1 Site Walkover Survey

A visual walkover survey of the property confirmed the following:

- The topographical understanding of the site developed from our desktop study, as outlined in Section 2, is in general accordance with that observed on site.
- Suitable building envelopes[4] can be formed on gently sloping land <15°.
- Redcliffs Road defines the access point to existing Lot 1 DP 322274. Proposed Lot 1 with the existing dwelling, access will remain as is. Proposed Lot 2 access will commence from River Drive, advancing through shared Lot 6 DP 191914 and right of way (RoW) Easement B from the northwest. Nearby land in all directions includes similar rural properties with open pasture and agriculture.

[4] *Measuring 30 m x 30 m according to FNDC District Plan Rule 13.7.2.2.*

- An existing residential dwelling, associated garden area, gravelled driveway, shed and water tanks is located on the southern section of the site.
- Overland flow paths extend throughout the lower elevations to the central portion of the site, progressing east to west terminating in the Rangitane Stream adjacent to the western boundary of the site.
- Existing structures are present on proposed Lot 1 with self-supporting three waters private infrastructure.

4.2 Ground Conditions

Arisings recovered from the exploratory boreholes were logged by a suitably qualified geotechnical engineering professional in general accordance with New Zealand Geotechnical Society guidelines[5]. Engineering borehole logs are presented as Appendix B to this report and approximate borehole positions recorded on Drawing No. 100 within Appendix A. Strata identified during the ground investigation can be summarised as follows:

- **Topsoil encountered to 0.2 m bgl.** Described as organic silt, light brown, dry, low plasticity.
- **Kerikeri Volcanics Group Ash to depths of >1.2m bgl.** The Kerikeri volcanic ash encountered are generally silty with trace clay and gravel, low plasticity and high permeability, brownish red in colour.

A summary of the ground investigation data is presented below as Table 2.

Table 2: Summary of Ground Investigation

Hole ID	Lot	Hole Depth	Topsoil Depth	Groundwater[2]	Wastewater Category[4]
BH01	2	1.5 m	0.2 m	NE	5 – moderate to slow draining
BH02	2	1.2 m	0.2 m	NE	5 – moderate to slow draining

1. *All depths recorded in m bgl unless stated.*
2. *Groundwater measurements taken on day of drilling.*
3. *NE – Not Encountered.*
4. *Wastewater category in accordance with Auckland Council TP58[6].*

5 WASTEWATER ASSESSMENT

The scope of this wastewater assessment comprised a ground investigation to ascertain a lot-specific wastewater disposal classification for concept design of suitable systems for a probable future rural residential development. Relevant design guideline documents adopted include:

[5] *New Zealand Geotechnical Society, Field Description of Soil and Rock, 2005.*
[6] *Auckland Council, Technical Publication 58, On-site Wastewater Systems: Design and Management Manual, 2004, Table 5.1.*

- Auckland Council, Technical Publication 58, On-site Wastewater Systems: Design and Management Manual, 2004.
- NZS1547:2012, On-site Domestic Wastewater Management.

The concept rural residential development within this report assumes that the proposed new lot may comprise up to a five-bedroom dwelling with a peak occupancy of eight people[7]. This considers the uncertainty of potential future Building Consent designs. The number of usable bedrooms within a residential dwelling must consider that proposed offices, studies, gyms, or other similar spaces maybe considered a potential bedroom by the Consent Authority.

5.1 Existing Wastewater Systems

An existing septic tank has been identified on proposed Lot 1 in relation to the existing dwelling, located east of the house adjacent to the carparking area (as indicated on Drawing No. 100), therefore, confirming the treatment system and associated disposal fields are contained within the lot boundaries. No other existing wastewater treatment or disposal systems have been identified or surveyed within the site boundaries.

5.2 Wastewater Generation Volume

In lieu of potable water infrastructure servicing the site, roof rainwater collection within on-lot tanks has been proposed for this assessment. The design water volume for roof water tank supply is estimated at 160 litres/ person/ day[8]. This assumes standard water saving fixtures[9] being installed within the proposed future development. This should be reviewed for each proposed lot at the Building Consent stage.

For the concept wastewater design, this provides a total daily wastewater generation of 1,280 litres/ day per proposed lot.

5.3 Treatment System

Selection of a wastewater treatment system will be provided by future developers at Building Consent stage. This will be a function of a refined design peak occupancy. It is recommended that to meet suitable minimum treated effluent output, secondary treatment systems are accounted for across the site. In Building Consent design, considering final disposal field topography and proximity to controlling site features, a higher treated effluent output standard such as UV disinfection to tertiary quality may be required.

No specific treatment system design restrictions and manufacturers are currently in place. However, the developer will be required to specify the treatment system proposed at the Building Consent stage.

---

[7] TP58 Table 6.1.

[8] TP58 Table 6.2, AS/ NZS 1547:2012 Table H3.

[9] Low water consumption dishwashers and no garbage grinders.

5.4 Land Disposal System

To provide even distribution, evapotranspiration assistance and to minimise effluent runoff, it is recommended that treated effluent is conveyed to land disposal via Pressure Compensating Dripper Irrigation (PCDI) systems, a commonplace method of wastewater disposal.

The proposed PCDI systems may be surface laid and covered with a minimum of 150 mm mulch and planted with specific evapotranspiration species with a minimum of 80 % species canopy cover or subsurface laid to topsoil with a minimum 200 mm thickness and planted with lawn grass. Site-won topsoil during development from buildings and/ or driveway footprints may be used in the area of land disposal systems to increase minimum thicknesses. Specific requirements of the land disposal system include the following which have been complied with for this report.

Table 3: Disposal Field Design Criteria

Design Criteria	Site Conditions
Topography at the disposal areas shall not exceed 25°. Exceedances will require a Discharge Consent.	Concept design complies
On shallower slopes <25° but >10°, compliance with Northland Regional Plan (NRP) rule C.6.1.3(6) is required.	Concept design complies, disposal fields sited on slopes <10°, cutoff drains not required.
On all terrain irrigation lines should be laid along contours.	Concept design complies
Disposal system situated no closer than 900 mm (vertically) from the winter groundwater table (secondary treated effluent).	Concept design complies
Separation from surface water features such as stormwater flow paths (including road and kerb channels), rivers, lakes, ponds, dams, and natural wetlands according to Table 9, Appendix B of the NRP.	Concept design complies. All overland flow paths separation distances to disposal areas are 15 m.
The effluent is treated and disposed of on-site such that each site has its own treatment and disposal system no part of which shall be located closer than 30 m from the boundary of any river, lake, wetland, or the boundary of the coastal marine area. FNDC rule 12.7.6.1.4	Concept design complies.

5.4.1 Soil Loading Rate

Based on the results of the ground investigation, conservatively, the shallow soils are inferred to meet the drainage characteristics of TP58 Category 5, sandy clay-loam, clay-loam, and silty clay loam – moderate to slow drainage. This correlates to NZS1547 Category 4, imperfectly drained described as clay loams. For a typical PCDI system, a Soil Loading Rate (SLR) of 3-4 mm/ day is recommended within NZS1547 Table 5.2 and TP58 Table 9.2.

To achieve the above SLR, technical guidance documents require the following compliance within the final design.

- 100 to 150 mm minimum depth of good quality topsoil (NZS1547 Table M1, note 1) to slow the soakage and assist with nutrient reduction.
- Minimum 50 % reserve disposal field area (TP58 Table 9.2, note 3) to adopt 4 mm/day, rather than 3mm/day SLR.

The proposed concept design adopts 3.5mm /day SLR, utilising a 50% reserve disposal field area.

5.4.2 Disposal Areas

The sizing of wastewater system disposal areas is a function of soil drainage, the loading rate and topographic relief. For each proposed lot, a primary and reserve disposal field is required as follows. The recommendations below are presented on Drawing No. 100.

- **Primary Disposal Field.** A minimum PCDI primary disposal field of 366 m^2 laid parallel to the natural contours.
- **Reserve Disposal Field.** NRP rule C.6.1.3(9)(b) requires a minimum reserve disposal field equivalent to 30 % of the primary disposal field for secondary or tertiary treatment systems. As discussed above in Section 5.4.1, the proposed concept design presents a 50% reserve disposal field area. Therefore, each proposed lot provides a 183 m^2 reserve disposal area to be laid parallel to the natural contours.
- Disposal fields discharging secondary treated effluent are to be set at the 20-year ARI (5 % AEP) flood inundation height to comply with the above NRP rule. Flood hazard potential has not been identified within the site boundaries and as such the site can provide freeboard above the 1 % AEP flood height to comply with this rule.

5.5 Summary of Concept Wastewater Design

Based on the above design assumptions a concept wastewater design is presented in Table 4 and presented schematically upon Drawing No. 100 (Appendix A). It is recommended that each lot is subject to Building Consent specific review and design amendment according to final development plans.

Table 4: Concept Wastewater Design Summary

Design Element	Specification
Concept development	Five-bedroom, peak occupancy of 8 (per lot)
Design generation volume	160 litres/ person/ day
Water saving measures	Standard. Combined use of 11 litre flush cisterns, automatic washing machine & dishwasher, no garbage grinder[1]
Water meter required?	No
Min. Treatment Quality	Secondary
Soil Drainage Category	TP58 Category 5, NZS1547 Category 4
Soil Loading Rate	3.5 mm/ day
Primary disposal field	Surface/ subsurface laid PCDI, min. 366 m^2
Reserve disposal field	Surface/ subsurface laid PCDI, min. 50 % or 183 m^2
Dosing Method	Pump with high water level visual and audible alarm. Minimum 24-hour emergency storage volume.

Stormwater Control	Divert surface/ stormwater drains away from disposal fields. Cut off drains not required.

1. Unless further water saving measures are included.

5.6 Assessment of Environmental Effects

An Assessment of Environmental Effects (AEE) is required to address two aspects of wastewater disposal. These include the effect of treated wastewater disposal for an individual lot and the cumulative or combined effect of multiple lots discharging treated wastewater to land as a result of subdivision.

The scale of final development is unknown at the time of writing and building areas, impervious areas including driveways, ancillary buildings, landscaped gardens, and swimming pools may reduce the overall area for on-site wastewater disposal. For the purpose of this report, the above impervious features are considered to be comprised within the conceptual 30 x 30 m square building envelope shown on Drawing 100, Appendix A. The conceptual wastewater disposal field areas are clear of this indicative building envelope area.

It is recommended that the AEE is reviewed at the time of Building Consent once specific development plans, final disposal field locations and treatment systems are established. The TP58 guideline document provides a detailed AEE for Building Consent applications. Based on the proposed scheme, ground investigation, walkover inspection and Drawing No. 100, a site-specific AEE is presented as Appendix C to demonstrate the proposed wastewater disposal concept will have a less than minor effect on the environment.

6 STORMWATER ASSESSMENT

Considering the nature of rural subdivision and residential development, increased storm water runoff occurs as pervious surfaces such as pasture are converted to impervious features such as roads or future on-lot buildings and driveways.

6.1 Impervious Surfaces and Activity Status

A summary of the impervious areas of the proposed lots is provided as Table 5 below which has been developed from our observations and the provided Scheme Plan. For the proposed lots, this has been taken as conceptual maximum probable development of typical rural residential scenarios. Refer Section 6.2.

The activity status reflected in Table 5 is with respect to Operative FNDC Plan Section 8.6.5.1.3 only. Furthermore, the subdivision stormwater proposal has been assessed in accordance with the Operative FNDC Plan Section 13.10.4, on the basis that the overall subdivision is determined to be a non-complying activity. Refer Appendix C.

Table 5: Summary of Impervious Surfaces

Surface	Proposed Lot 1	Proposed Lot 2	Lot 3 DP 191914 (easement B)	Lot 6 DP 191914 (shared lot for RoW)
Existing Condition	**(20,382 m^2)**	**NA**	**(4,725 m^2)**	**(973 m^2)**

Roof (house & surround)	360 m^2	1.8 %			0 m^2	0.0 %	0 m^2	0.0 %
Driveway	420 m^2	2.0 %			0 m^2	0.0 %	0 m^2	0.0 %
Total impervious	780 m^2	3.8 %			0 m^2	0.0 %	0 m^2	0.0 %
Proposed Condition	**(6,900 m^2)**		**(13,480 m^2)**		**(4,725 m^2)**		**(973 m^2)**	
Roof (house & surround)	360 m^2	5.2 %	300 m^2	2.2 %	0 m^2	0.0 %	0 m^2	0.0 %
Driveway	420 m^2	6.1 %	200 m^2	1.5 %	352 m^2	7.4 %	293 m^2	30.1 %
Total	780 m^2	11.3 %	500 m^2	3.7 %	352 m^2	7.4 %	293 m^2	30.1 %
Activity Status	Permitted		Permitted		Permitted		NA	

6.2 Stormwater Management Concept

The stormwater management concept considered in this report has been prepared to meet the requirements of the local and regional consent authorities considering the design storm event as follows:

- **Probable Future Development (Proposed Lot 2).** The proposed application includes subdivision formation only and not lot-specific residential development at this stage. However, a conservative proposal for probable future on-lot development has been developed for this assessment considering variation of scale in typical rural residential development.

  The probable future on-lot development concept includes up to 300 m^2 potential roof area and up to 200 m^2 potential driveway or parking areas. The runoff from the latter area has been modelled as an offset within the lot-specific roof rainwater attenuation devices.

- **Proposed Accessway Development (ROW)**

  The design concept involves mitigating and attenuating two catchment areas, A and B encapsulating 645 m^2 of impervious driveway area formed through Lot 6 and Easement B in Lot 3. This additional driveway area will need to be provided with independent storage/ detention with a controlled outlet device as it is too much to be offset within the roof runoff tanks of the proposed lots.

  It is therefore proposed in this concept that this driveway runoff be collected by means of a swale and directed to a single new underground stormwater tank located at the northern elbow of easement B inside Lot 3 DP191914 boundary. This will be installed at formation of the subdivision.

  The outlet flow from the tank is directed to the adjacent overland flow path to the north that converges into the Rangitane Stream 200 m to the east. Catchment B, indicated in Drawing Sheet 100, has been offset within the storage of the tank. Outflow discharging from swale catchment B at the low point within proposed lot 2 will be dissipated by rip rap mattress before coursing towards an overland flow path. Although this discharges to

a different watercourse (than Catchment A) the effect is less than minor due to the proximity of both catchments to the same river, and with no immediate downstream property flood hazards. Refer to Drawing No. 100 in Appendix A.

- **Existing On-site Development (Proposed Lot 1).** An existing dwelling with a total roof area of 360 m² and impervious driveway area of 420 m² is located within the boundaries of proposed Lot 1. There are two 25,000 l tanks servicing the property currently. Impervious areas are below the permitted activity threshold as indicated above in Table 5, therefore, attenuation for compliance in this regard is not necessary.

6.3 Design Storm Event

Relevant design rainfall intensity and depths have been ascertained for the site location from the NIWA HIRDS meteorological model[12]. The NIWA HIRDS rainfall data is presented in full within Appendix D. Provision for climate change has been adopted by means of applying a factor of 20% to rainfall intensities, in accordance with FNDC Engineering Standard 2023.

It has been identified that development of the site poses an increase to flooding hazard on downstream properties. Therefore, in order to provide flood control in compliance with FNDC Engineering Standard Table 4-1, the concept design attenuates the post-development stormwater runoff peak discharge to 80% of the pre-development condition for the 1% AEP storm event with provision for climate change. This provision also complies with NRP Rule C6.4.2(2).

Furthermore, the Table 4-1 stipulates that flow attenuation controls reduce the post-development peak discharge to 80% of the pre-development condition for the 50% and 20% AEP storm event with provision for climate change.

To be compliant with the above rules, the attenuation modelling within this report has been undertaken for all of the above storm events. The results are summarised in Table 7 and Table 8, with calculations provided in full in Appendix D.

Outlet dispersion devices have been designed to manage the 1% AEP event to reduce scour and erosion at discharge locations. These are detailed further in Section 6.4.1 of this report.

6.4 Concept Stormwater Attenuation

Based on the design storm events indicated above and the corresponding modelling results (in Appendix D) an attenuation concept to suit the maximum storage requirement has been provided. In this case the concept limits the post-development peak discharge to 80 % of the pre-development condition for the 1% AEP storm event. This is achievable by installing specifically sized low-flow orifices into the attenuation devices.

The rational method has been adopted by Geologix with run-off coefficients as published by FNDC Engineering Standards[13] to provide a suitable concept attenuation design to limit post-

[12] *NIWA High Intensity Rainfall Data System, https://hirds.niwa.co.nz.*
[13] *FNDC Engineering Standards 2023, Version 0.6, Issued May 2023.*

development peak flows to 80% of pre-development conditions. The proposed devices with the concept design are listed below:

- Roof Runoff Tanks

Conceptual storage and outlet requirements within the tanks are included in Appendix D and a typical schematic retention/ detention tank arrangement detail is presented as Drawing No. 401 within Appendix A.

- Underground Tank

Conceptual storage and outlet requirements within the prescribed underground tank are detailed in Appendix D. The calculations indicate storage requirements for impervious driveway to 80 % of the 1 % AEP pre-development peak flow.

The catchment is split into catchment A and B. The attenuation of the downstream catchment B will be managed by way of offset (over-attenuation) of catchment A within the tank. Requires 13,265l storage to attenuate the total 645 m^2.

Please refer to Appendix A, Drawing No. 100 for indication of the tank positions and concept.

For all above proposed devices, the concept design presented in this report should be subject to verification and an updated design at the Building Consent stage once final development plans are available. This is typically applied as a consent notice to the applicable titles. We note that the detailed design will be required to provide appropriate outlet to ensure the 50% and 20% AEP events, in addition to the 1% AEP event, are specifically controlled within the tank. This is typically provided with a suitable orifice arrangement.

Table 6: Summary of Concept Stormwater Attenuation

Item	Pre-development Impervious Area	Post-development Impervious Area	Proposed Concept Attenuation Method
Future Concept Development (Lot 2)			
Potential buildings	0 m^2	300 m^2	Detention within roof water tanks
Potential driveways	0 m^2	200 m^2	Off-set detention in roof water tanks
Total	**0 m^2**	**500 m^2**	
Accessway Development (ROW/ driveway for Lot 2)			
Catchment Area A - driveway in Lot 6 and Lot 3, easement B	0 m^2	440 m^2	Detention within underground tank
Catchment Area B - driveway in Lot 3, easement B	0 m^2	205 m^2	Off-set detention in underground tank
Total	**0 m^2**	**645 m^2**	
Existing Development (Lot 1)			

Existing buildings	360 m^2	360 m^2	Not Required, impervious area < permitted activity
Existing driveway	420 m^2	420 m^2	Not Required, impervious area < permitted activity
Total	**780 m^2**	**780 m^2**	

Calculations to support the concept design are presented as Appendix D to this report. A summary of the probable future development attenuation concept design is presented as Table 7 (tanks) and Table 8 (underground tank). As above, it is recommended that this concept design is refined at the Building Consent stage once final development plans are available.

Table 7: Probable Future Development Attenuation Concept - Tanks

Design Parameter	Flow Attenuation: 50 % AEP (80 % of pre dev)	Flow Attenuation: 20 % AEP (80 % of pre dev)	Flood Control: 10 % AEP	Flood Control: 1 % AEP (80 % of pre dev)
Proposed Lot 2 – Roof Tanks				
Regulatory Compliance	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1	NRC Proposed Regional Plan	FNDC Engineering Standards Table 4-1
Pre-development peak flow	5.34 l/s	6.92 l/s	8.07 l/s	12.05 l/s
80 % pre-development peak flow	4.27 l/s	5.53 l/s	NA	9.64 l/s
Post-development peak flow	9.87 l/s	12.77 l/s	14.91 l/s	22.25 l/s
Total Storage Volume Required	8,749 litres	11,414 litres	5,512 litres	20,423 litres
Concept Summary:	- Attenuation storage calculation accounts for offset flow from 200 m^2 driveway (not indicated explicitly indicated in summary above. Refer Appendix D for calcs in full) - Attenuation to 80 % of pre-development condition for 1 % AEP storm represents maximum storage requirement and is adopted for the concept design tank storage. - 2 x 25,000 litre tank is sufficient for attenuation (20,423 l) + domestic water storage (29,577 l) - 1 % AEP attenuation (in isolation) requires a 32 mm orifice 0.97 m below overflow. However regulatory requirements are to consider an additional orifice/s to control the 50 %, 20 % and 1 % AEP events specifically. We note this may vary the concept orifice indicated above. This should be provided with detailed design for building consent approval.			

Table 8: Accessway (ROW) Development Attenuation Concept – Underground Tank

Design Parameter	Flow Attenuation: 50 % AEP (80 % of pre dev)	Flow Attenuation: 20 % AEP (80 % of pre dev)	Flood Control: 10 % AEP	Flood Control: 1 % AEP (80 % of pre dev)
Private Accessway, Lot 6 DP 191914 & Lot 3 DP 191914 Easement B – Underground Tank				
Regulatory Compliance	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1	NRC Proposed Regional Plan	FNDC Engineering Standards Table 4-1
Pre-development peak flow	6.89 l/s	8.92 l/s	10.41 l/s	15.54 l/s

80 % pre-development peak flow	5.51 l/s	7.14 l/s	NA	12.43 l/s
Post-development peak flow	11.63 l/s	15.06 l/s	17.58 l/s	26.23 l/s
Total Storage Volume Required	5,646 litres	7,402 litres	4,654 litres	13,265 litres
Concept Summary:	- Attenuation storage calculation accounts for runoff from 645 m² of driveway area. - Attenuation to 80 % of pre-development condition for 1 % AEP storm represents maximum storage requirement and is adopted for the concept design storage. - Underground tank storage capacity required is 13,265l. - Outlet arrangement to be finalised at detailed design.			

6.4.1 *On-Lot Discharge Dispersion*

The direct discharge of rainwater tank overflow in a concentrated manner can cause scour and erosion in addition to saturation of shallow soils. It is recommended that overflow from rainwater detention tanks is conveyed in sealed pipes to a designated discharge point with suitable dispersion devices that are downslope of proposed building footprints and wastewater disposal fields. A concept design accommodating this is presented within Appendix A on Drawing Nos. 401 and 402.

It is recommended that the conceptually sized dispersion devices are subject to specific assessment at the Building Consent stage to limit scour and erosion from tank overflows.

Typical rural residential developments construct either above or below ground discharge dispersion pipes. Feeding pipes can be either buried or pinned to the surface as desired. It is recommended that all pipes are designed to accommodate the maximum tank overflow. A concept dispersion pipe or trench length is presented as Table 9. Calculations to derive this are presented within Appendix D, based on the Auckland Council TR2013/018 document, a widely adopted standard for this application in New Zealand.

Table 9: Summary of Concept Dispersion Devices

Concept Impervious Area to Tank	Velocity at single spreader orifices	Tank outlet pipe diameter	Spreader pipe diameter	Dispersion Pipe/ Trench Length	Spreader orifice size	Concept
Proposed Lot 2 Future development						
500 m²	0.87 m/s	0.1 m	0.2 m	10.2 m	20 mm, spaced at 200 mm intervals	Above ground dispersion device or in-ground dispersion trench.

6.5 Subdivision Development Management

Stormwater management of the RoW is proposed as follows:

- RoW formed with a consistent 4 % cross fall to a swale drain along a single edge. Swale drain will convey runoff to underground storage tank, which will overflow into adjacent overland flow path via suitable dispersion outlet device.
- Provide a new 375 mm diameter Reinforced Concrete Pipe Culvert (RCP) at the vehicle crossing at River Drive, to provide conveyance of drainage beneath the lot accessway.

The above measures are indicated on Drawing No. 100 within Appendix A.

6.6 Stormwater Quality

The proposed application is for a rural residential subdivision and future development. The key contaminant risks in this setting include:

- Sediments and minor contaminants washed from impervious surfaces.
- Leaf matter, grass, and other organic debris.

Stormwater treatment requirements are minor to maintain good quality stormwater discharge. Stormwater quality will be provided by:

- Leaf guards on roof guttering/ first flush devices on roof guttering and downpipes.
- Rainwater tank for potable use onsite only to be filled by roof runoff.
- Room for sedimentation (minimum 150 mm recommended as per Auckland Council GD01) within the base of the stormwater attenuation roof runoff tanks as dead storage volume.
- Stormwater discharges directed towards roading swale drains where possible.
- Grassed swale drains from rainwater inception (road surfaces) to discharge points.

The risk of other contaminants being discharged out of the site boundaries (hydrocarbons, metals etc.,) as a result of the proposed activities once stormwater has been processed through the above measures that will affect the downstream water quality is considered low.

7 POTABLE WATER & FIRE FIGHTING

In the absence of potable water infrastructure within Redcliffs Road, River Drive and/ or within the site, it is recommended that roof runoff water tanks are adopted for potable water supply with appropriate filtration and UV disinfection at point of use. The volume of potable water supply on each lot should consider the required stormwater detention volume identified within Table 7.

Furthermore, the absence of potable water infrastructure and fire hydrants within Redcliffs Road and River Drive require provision of the on-lot roof water supply tanks to be used for firefighting purposes (if required). Specific analysis and calculations for firefighting is outside

the scope of this report and may require specialist input. Supply for firefighting should be made in accordance with SNZ PAS4509:2008.

8 EARTHWORKS

The following earthworks provisions are anticipated for subdivision formation and for future development within the proposed lots:

- **Vehicle crossing.** Cut/ fill earthworks for construction of the vehicle crossing (to proposed Lot 2) to Council Engineering Standards. Required at subdivision formation, to give access to the proposed Lot 2.
- **ROW Accessway.** Cut/ fill earthworks of RoW from River Drive to proposed Lot 2. Required at subdivision formation, to give access to the proposed Lot 2.
- **ROW Swale.** Cut/ fill earthworks of swale drain extending from River Drive to proposed Lot 2. Required at subdivision formation.
- **Building platform.** Cut/ fill earthworks for a future building platform on proposed Lot 2. Required at future development stage, to be detailed within building consent application.

8.1 Earthwork Volumes

Considering a 220 m length of RoW for proposed Lot 2 to be constructed, earthwork volumes have been conceptually sized as outlined in Table 10.

Table 10: Summary of Proposed Earthwork Volumes

Item	Assessment	Comments
Length of earthworks	220 m	Length of RoW to proposed Lot 2 boundary
Width of Earthworks	4 m	Width of RoW to proposed Lot 2 boundary
Area of Earthworks	880 m^2	Area of RoW to proposed Lot 2 boundary
Cut Volume	319 m^3	Incl. 220 m swale drain, 0.5 m deep with 1:1 side slope
Fill Volume	291.5 m^3	Grade to 4 % across width of RoW proposed Lot 2 boundary

Proposed earthwork volumes are well within a 5,000 m^3 Permitted Activity volume limit outlined by FNDC District Plan Rule 12.3.6.1.1(a) and the maximum cut and fill height is <3 m to comply with 12.3.6.1.1(b).

Rule C.8.3.1, Table 13 of the Proposed Regional Plan outlines a Permitted Activity as 5,000 m^2 of exposed earth at any time for 'other areas'. Proposed earthwork areas to form the subdivision, are anticipated to comply with the Permitted Activity standard for other areas.

8.2 General Recommendations

Bulk fill with site-won earth can be moderately sensitive to disturbance when exposed to rain or runoff which may cause saturation or vehicle movements and trafficking during earthworks. Accordingly, care should be taken during construction, including probable future

developments to minimise degradation of any earth fill due to construction traffic and to minimise machinery on site.

Any areas of proposed bulk fill which are required to meet specific subgrade requirements within should be subject to a specific earthwork specification prepared by a professional Engineer such as Geologix.

Due to the scope of work and topography of the site, significant excavations are not anticipated. However, to reduce the risk of instability of excavations during construction, it is recommended that **temporary** unsupported excavations have a maximum vertical height of 0.5 m. Excavations >0.5 m should be battered at 1V:1H or 45°. Permanent batter slopes may require a shallower angle to maintain long term stability and if proposed these should be assessed at the Building Consent stage within a specific geotechnical investigation report.

Temporary batters should be covered with polythene sheets secured to the surface with pins or batons to prevent saturation. All works within close proximity to excavations should be undertaken in accordance with Occupational Safety and Health regulations.

All earthworks should be carried out in periods of fine weather within the typical October to April earthwork season. Consent conditions commonly prescribe working restrictions.

8.3 Erosion and Sediment Control

Specific erosion and sediment control measures are required to control sediment runoff from areas of proposed earthworks within the scope of this application. It is recommended that specific on-lot development is assessed at the time of Building Consent by the future developer. To form the subdivision the following erosion and sediment control measures are recommended:

- Silt fence around the downslope face of the proposed RoW to proposed Lot 2.
- Stabilised access crossings into the site off River Drive.

9 NATURAL HAZARD ASSESSMENT

To satisfy the Resource Management Act, 1991 the proposed subdivision must plan for and manage the risk from natural hazards to reduce the potential adverse effects to less than minor. Regulatory assessment of natural hazards at the site location are managed under the jurisdiction of the FNDC District Plan[14], Northland Regional Council (NRC) Proposed Regional Plan for Northland[15] and Regional Water and Soil Plan for Northland. Following our ground investigation and considering the measures presented in this report, a summary of the proposed activities against defined natural hazards is presented as Table 11.

Table 11: Summary of Natural Hazards

Natural Hazard	Applicability	Mitigation & Effect on Environment

[14] *Operative District Plan Rule 13.7.3.2.*

[15] *Proposed Regional Plan for Northland, Appeals Version, July 2021, Chapter D.6.*

Erosion	Yes	Mitigation provided by means of stormwater dispersion control and erosion and sediment control measures; resultant effects are less than minor.
Overland flow paths, flooding, inundation	Yes	Mitigation provided by means of flood control attenuation; resultant effects are less than minor.
Landslip	NA	No mitigation required, less than minor.
Rockfall	NA	No mitigation required, less than minor.
Alluvion	NA	No mitigation required, less than minor.
Avulsion	NA	No mitigation required, less than minor.
Unconsolidated fill	NA	No mitigation required, less than minor.
Soil contamination	NA	No mitigation required, less than minor.
Subsidence	NA	No mitigation required, less than minor.
Fire hazard	NA	No mitigation required, less than minor.
Sea level rise	NA	No mitigation required, less than minor.

NA – Not Applicable.

10 INTERNAL ROADING AND VEHICLE CROSSINGS

It should be noted that we are not traffic engineers, and no specific Traffic Impact Assessment is included within the scope of this report. If required, it is recommended that advice is sought from a chartered traffic engineer.

10.1 Right of Way

A private access RoW will provide internal access to proposed Lot 2 and will be constructed to the standards specified in Appendix 3B-1 of the Operative District Plan, as presented in Table 12 below.

Table 12: Summary of Proposed RoW Specification

Location	Servicing Lots	H.E.	Standard	Min. Legal Width	Min. Carriageway Width	Maximum Gradient
Lot 6 DP 191914	Proposed Lot 2, Lot 3, 4, 5 of DP 191914	4	Private access 3-4 HE, unsealed – with passing bays if required	7.5 m	3.0 m with swale	1:5
RoW, Easement on Lot 3 DP 191914	Proposed Lot 2	2	Private access 2 HE, unsealed	5.0 m	3.0 m with swale	1:5

HE – Household Equivalents

It is proposed to construct a grassed swale drain along the northern edge of the proposed RoW. The proposed RoW shall be graded with a 4 % cross fall to direct stormwater runoff to discharge into RoW grassed swale drain.

10.2 Vehicle Crossings

The new vehicle crossing for proposed Lot 2 will be formed at subdivision formation.

A sight distance of approximately 115 m is available at the proposed vehicle crossing, looking right (north) and >200 m looking left (south-west). In keeping with FNDC Engineering Standards 2023, a 115 m sight distance is sufficient for an approaching speed of 70km/h which is a reasonable speed for this section of River Drive.

An existing vehicle crossing services proposed Lot 1 and will remain as is.

Table 13: Summary of Proposed Vehicle Crossings

Location	Type	Detail	Formation
River Drive/ Lot 6 DP 1191914 Entrance	FNDC Type 1A, Light Vehicles	Construct to typical detail with 375 mm dia. RC pipe culvert and 3.0 m width at boundary.	Subdivision

RCP – Reinforced Concrete Pipe

11 LIMITATIONS

This report has been prepared for Richard Ayton as our Client. It may be relied upon by our Client and their appointed Consultants, Contractors and for the purpose of Consent as outlined by the specific objectives in this report. This report and associated recommendations, conclusions or intellectual property is not to be relied upon by any other party for any purpose unless agreed in writing by Geologix Consulting Engineers Ltd and our Client. In any case the reliance by any other party for any other purpose shall be at such parties' sole risk and no reliability is provided by Geologix Consulting Engineers Ltd.

The opinions and recommendations of this report are based on plans, specifications and reports provided to us at the time of writing, as referenced. Any changes, additions or amendments to the project scope and referenced documents may require an amendment to this report and Geologix Consulting Engineers should be consulted. Geologix Consulting Engineers Ltd reserve the right to review this report and accompanying plans.

The recommendations and opinions in this report are based on arisings extracted from exploratory boreholes at discrete locations and any available existing borehole records. The nature and continuity of subsurface conditions, interpretation of ground condition and models away from these specific ground investigation locations are inferred. It must be appreciated that the actual conditions may vary from the assumed ground model. Differences from the encountered ground conditions during subdivision construction may require an amendment to the recommendations of this report.

APPENDIX A

Drawings

CONCEPTUAL DESIGNED 15,000L UNDERGOUND STORMWATER DETENTION TANK TO ATTENUATE 645 m² FROM LOT 6 & LOT 3 WITHIN EASEMENT B DRIVEWAY CATCHMENT

VEHICLE CROSSING AS PER FNDC TYPE 1A STANDARD WITH MIN. 375 mm Ø. RCP CULVERT

SCRUFFY DOME CONNECTING TO UNDERGROUND TANK INVERT

PROPOSED GRASS LINED SURFACE CHANNEL TO OVERLAND FLOW PATH VIA UNDERGROUND TANK

CONCEPT RIPRAP MATTRESS AT CHANNEL OUTLET/ LOW POINT, DIRECTED TOWARD STREAM OR OVERLAND FLOWPATH

PRIVATE ACCESSWAY WITHIN LOT 3 DP 191914

SWALE CATCHMENT AREA B (205 m²) TO BE OFFSET

SWALE CATCATCHMENT A AREA (440 m²) TO TANK

PRIVATE ACCESSWAY WITHIN LOT 6 DP 191914

PROPOSED GRASS LINED SURFACE CHANNEL TO PROPOSED UNDERGROUND TANK

CONCEPT RIPRAP MATTRESS AT CHANNEL OUTLET/ LOW POINT DIRECTED TOWARD OVERLAND FLOWPATH

EXISTING WASTEWATER SYSTEM

EXISTING RESIDENTIAL DWELLING

EXISTING IMPERVIOUS DRIVEWAY AND PARKING

EXISTING VEHICLE CROSSING WITH CP CULVERT TO REMAIN AS IS CURRENTLY

LOT 2
1.3480 ha

LOT 1
6900 m²

LOT 6 DP 191914

LOT 6 DP 191481

LOT 5 DP 191914

LOT 4 DP 191914

LOT 3 DP 191914

LOT 3 DP 343454

LOT 2 DP 343454

RIVER DRIVE

REDCLIFFS ROAD

RANGITANE STREAM

BH01

BH02

40.0

1.5

3.0

35.0

30.0

10.0

3.4

25.0

10.2

20.0

20.0

20.0

25.0

30.0

30.0

25.0

20.0

GENERAL NOTES

1. DRAWING REPRODUCED FROM THOMSON SURVEY PROPOSED SCHEME PLAN REF. 10614, DATED 25 MARCH 2024.
3. HORIZONTAL CO ORDINATE SYSTEM = NZTM.
4. VERTICAL DATUM = NZVD.
5. MAJOR INTERVALS 5.0 m.
6. MINOR INTERVALS 1.0 m.
7. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
8. DO NOT SCALE FROM THIS DRAWING.

CONCEPT WASTEWATER DESIGN

CONCEPT DEVELOPMENT	5 BEDROOM
CONCEPT NO. OF OCCUPANTS	8 PERSONS
DAILY WASTEWATER GEN.	160 LITRES/PERSON/ DAY
TOTAL WASTEWATER GEN.	1,280 LITRES/ DAY
SOIL CATEGORY (TP58)	CATEGORY 5
SOIL CATEGORY (NZS1547)	CATEGORY 4
SOIL LOADING RATE	3.5 mm/ DAY
TREATMENT SYSTEM	NO - SUBJECT TO BUILDING CONSENT DESIGN
PRIMARY DISPOSAL AREA	366 m²
RESERVE DISPOSAL AREA	183 m² (50 %)
FINAL DESIGN?	NO - SUBJECT TO BUILDING CONSENT DESIGN
CUT OFF DRAINS?	NO
DISCHARGE CONSENT?	NO

CONCEPT BUILDING ENVELOPE (30 m X 30 m)

BHXX GEOLOGIX HAND AUGER LOCATION - MAY 2024

WATERCOURSE

OVERLAND FLOWPATH

POND

DIRECTION OF STORMWATER RUNOFF

SW EXISTING GRASSED SWALE DRAIN

SW PROPOSED RoW GRASSED SWALE DRAIN

PRIMARY DISPOSAL FIELD

RESERVE DISPOSAL FIELD

CONCEPT 25,000 LITRE WATER TANK ATTENUATING TO DISPERSION DEVICE TO CONTROL 500 m² AREA

12.5 0 Meters 12.5 25

1:250

Revision	Issue	Date
A	CONSENT	09/08/2024

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

33 REDCLIFFS ROAD
KERIKERI
LOT 1 DP 322274

Project	Drawn By
C0492	SD

Client

RICHARD AYTON

Sheet Title

ENGINEERING PLAN

Sheet

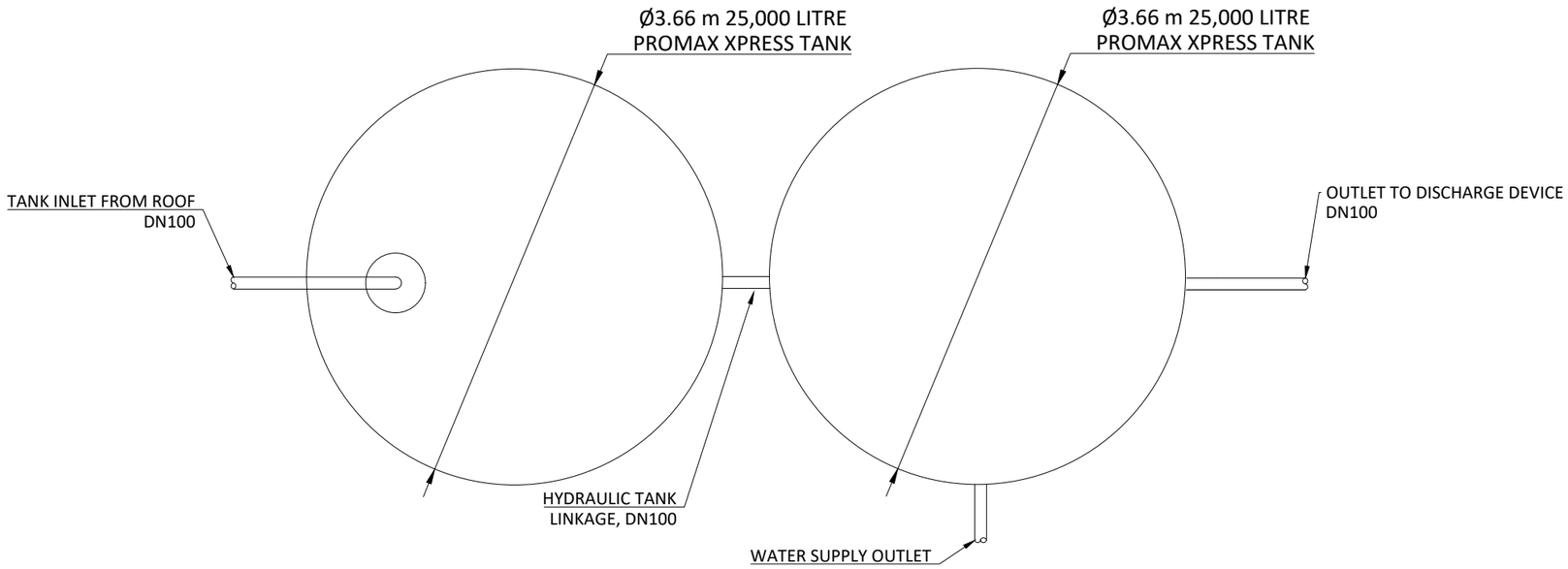
100

FILE PATH: Z:\Projects\C0400-C0499\33 Redcliffs Road, Kerikeri - C0492\07 - Technical & Drawings\Dr-awings\C0492-5-01-R01.dwg[C0492-5-01-R01.dwg

PLOTTED: 03/04/2022

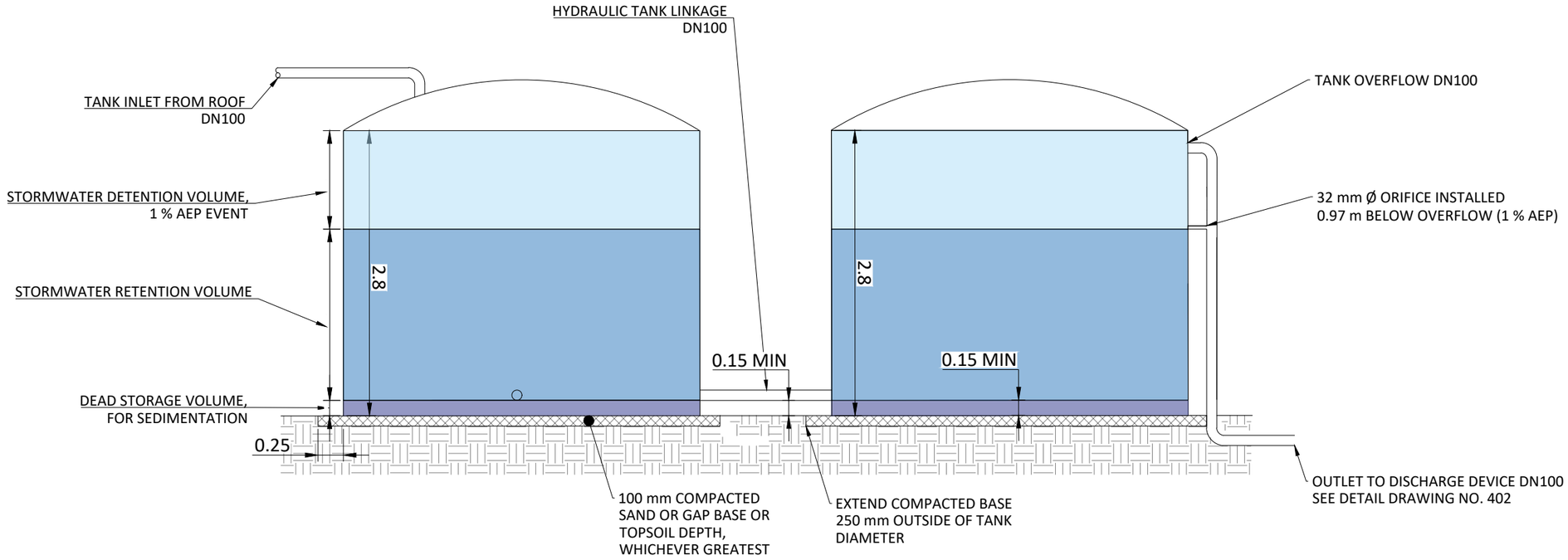
PROPOSED TANK PLAN VIEW

1:50, A3



PROPOSED TANK SIDE VIEW

1:50, A3



GENERAL NOTES

1. TANK, PIPING AND FITTINGS TO BE INSTALLED AS PER MANUFACTURERS RECOMMENDATIONS AND IN ACCORDANCE WITH NZBC E1, UNLESS SPECIFICALLY STATED OTHERWISE.
2. ALL WORK TO BE UNDERTAKEN IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 ACCEPTABLE SOLUTIONS, RELEVANT STANDARDS AND GUIDELINES.
3. DO NOT SCALE FROM THIS DRAWING.
4. CONTRACTOR IS TO ORGANISE ALL SET OUT, INSPECTIONS AND MONITORING AS REQUIRED TO MEET CONSENT CONDITIONS.

1	CONSENT	02/07/2024
Revision	Issue	Date

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

33 REDCLIFFS ROAD
KERIKERI
LOT 1 DP 322274

Project	Drawn By
C0492	SD

Client

RICHARD AYTON

Sheet Title

TYPICAL TANK DETAIL

Sheet

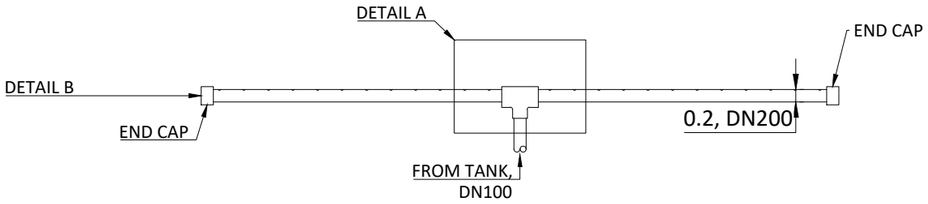
401

FILE PATH: Z:\Projects\C0400-C0499\33 Redcliffs Road, Kerikeri - C0492\07 - Technical & Drawings\3Dr.awings\C0492-SW-DETAILS.dwgC0492-SW-DETAILS.dwg

PLOTTED: 03/05/2022

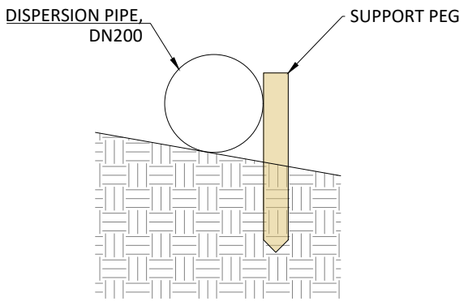
OPTION 1: DISPERSION VIA ABOVE GROUND PIPE

NOT TO SCALE



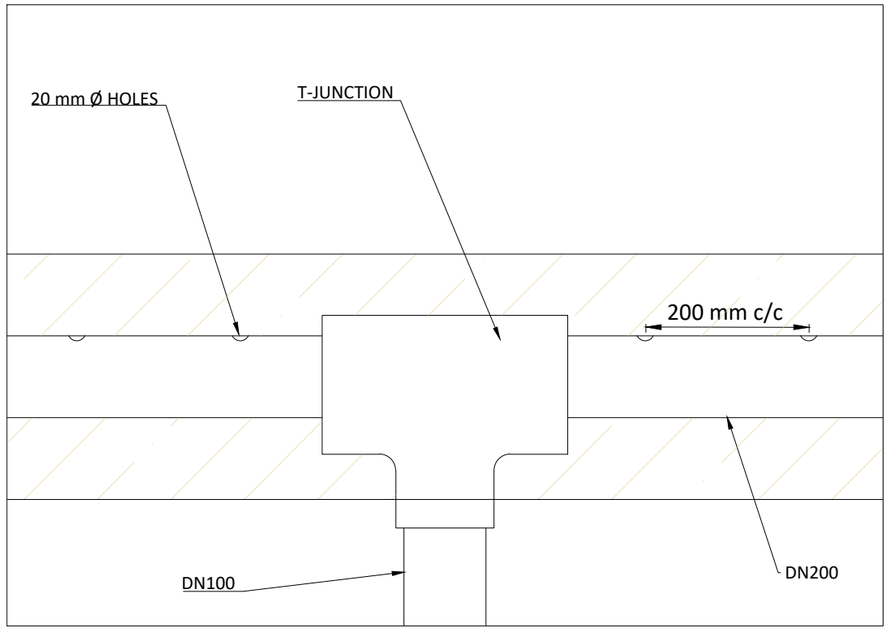
DETAIL B - SIDE VIEW

NOT TO SCALE



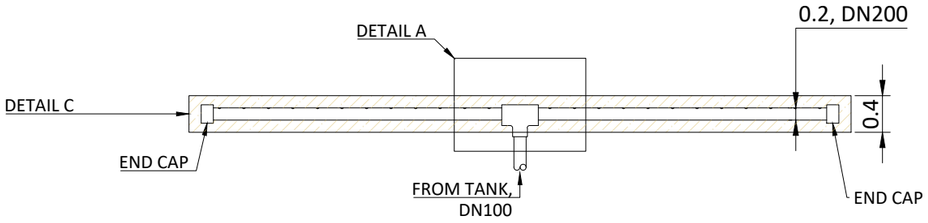
DETAIL A - T JUNCTION AND PERFORATIONS

NOT TO SCALE



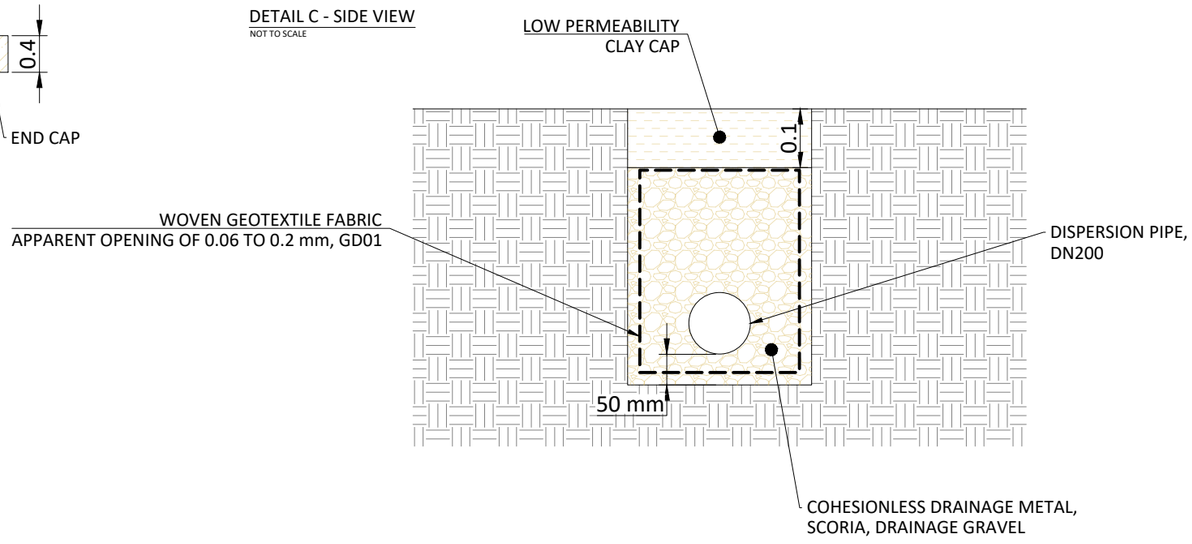
OPTION 2: DISPERSION VIA BELOW GROUND TRENCH

NOT TO SCALE



DETAIL C - SIDE VIEW

NOT TO SCALE



GENERAL NOTES

1. ALL WORK TO BE UNDERTAKEN IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 ACCEPTABLE SOLUTIONS, RELEVANT STANDARDS AND GUIDELINES INCLUDING AUCKLAND COUNCIL GD01, WHERE APPLICABLE.
2. DO NOT SCALE FROM THIS DRAWING.
3. CONTRACTOR IS TO ORGANISE ALL SET OUT, INSPECTIONS AND MONITORING AS REQUIRED TO MEET CONSENT CONDITIONS.

1	CONSENT	02/07/2024
Revision	Issue	Date

geologix consulting engineers

AUCKLAND | NORTHLAND

Project Name and Address

33 REDCLIFFS ROAD
KERIKERI
LOT 1 DP 322274

Project	Drawn By
C0492	SD

Client

RICHARD AYTON

Sheet Title

TYPICAL DISPERSION PIPE DETAIL

Sheet

402

FILE PATH: Z:\Projects\C0400-C0499\33 Redcliffs Road, Kerikeri - C0492\07 - Technical & Drawings\Drawings\C0492-SW-DETAILS.dwg|C0492-SW-DETAILS.dwg

PLOTTED: 03/05/2022

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APPENDIX B

Engineering Borehole Records

INVESTIGATION LOG

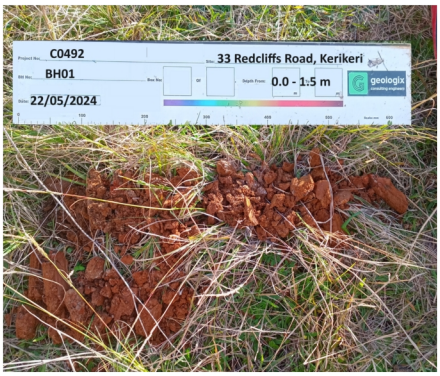
HOLE NO.: BH01

CLIENT: Richard Ayton
PROJECT: 33 Redcliffs Road
JOB NO.: C0492

SITE LOCATION: 33 Redcliffs Road, Kerikeri
START DATE: 22/05/2024
CO-ORDINATES: 1687618mE, 6105288mN
ELEVATION: Ground
END DATE: 22/05/2024
CONTRACTOR: Internal
RIG: 50mm Auger & DCP
DRILLER: GB & TW
LOGGED BY: GB & TW

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: 3282	WATER
TOPSOIL comprising of Organic silt with trace rootlets content; dark brown. Dry; friable.		0.0	TS			Groundwater Not Encountered
Clayey SILT, with trace gravel; dark orange brown. Very stiff; moist; low plasticity; gravel, fine; [Kerikeri Volcanic Group].		0.2			195+	
SILT, with some clay, with trace gravel; dark orange brown. Very stiff to hard; moist; low plasticity; gravel, fine; [Kerikeri Volcanic Group].		0.4			UTP	
		0.6			UTP	
		0.8			UTP	
		1.0			UTP	
1.4m - 1.5m: Grades to have minor fine gravels.		1.2			UTP	
End Of Hole: 1.50m		1.4				
		1.6		19		
		1.8		16		
		2.0		6		
		2.2		6		
		2.4		11		
		2.6		9		
		2.8		6		
		3.0		5		
		3.2		10		
		3.4		10		
		3.6		17		
		3.8		14		
		4.0		7		
		4.2		6		
		4.4		8		
		4.6		10		
		4.8		12		

PHOTO(S)



REMARKS

1. Borehole terminated at 1.5 m bgl due to hard strata encountered.
2. Dynamic Cone Penetration (DCP) testing was carried out from base of borehle to 4.3 m bgl.
3. Groundwater was not encountered at the time of drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- [x] Hand Auger
- [ ] Test Pit

INVESTIGATION LOG

HOLE NO.: BH02

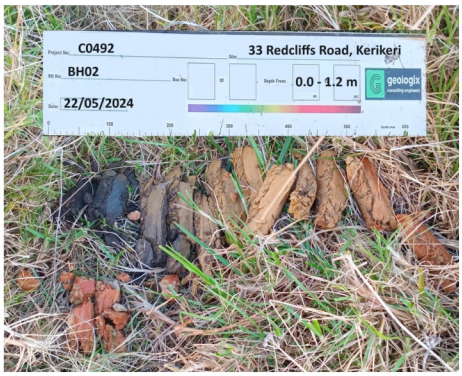
CLIENT: Richard Ayton
PROJECT: 33 Redcliffs Road

JOB NO.: C0492

SITE LOCATION: 33 Redcliffs Road, Kerikeri
START DATE: 22/05/2024
CO-ORDINATES: 1687636mE, 6105308mN
ELEVATION: Ground
END DATE: 22/05/2024
CONTRACTOR: Internal
RIG: 50mm Auger
DRILLER: GB & TW
LOGGED BY: GB & TW

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)	VANE SHEAR STRENGTH (kPa)	WATER
TOPSOIL comprising of Organic silt with trace rootlets content; dark brown. Dry; friable.		0.0 – 0.2	TS	2 4 6 8 10 12 14 16 18	Vane: 50 100 150 200 Values	Groundwater Not Encountered
Clayey SILT; light orange brown with red mottles. Moist; low plasticity; [Kerikeri Volcanic Field].		0.2 – 0.8				
SILT, with some clay; brownish dark orange and light grey mixed. Moist; low plasticity; [Kerikeri Volcanic Field].		0.8 – 1.2				
End Of Hole: 1.20m		1.2 – 2.8				

PHOTO(S)



REMARKS

1. Borehole was drilled to target depth of 1.2 m bgl.
2. Groundwater was not encountered at the time of drilling.

WATER

- ▼ Standing Water Level
- ▷ Out flow
- ◁ In flow

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

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APPENDIX C

Assessment of Environmental Effects and Assessment Criteria

Table 14: Wastewater Assessment of Environmental Effects

Item	NRC Separation Requirement[2]	FNDC Separation Requirement	Site Assessment[3]
Individual System Effects			
Flood Plains	Above 5 % AEP	NR	Complies according to available GIS data and visual assessment.
Stormwater Flowpath[4]	5 m	NR	Complies, see annotations on Drawing No. 100.
Surface water feature[5]	15 m	30 m	Complies.
Coastal Marine Area	15 m	30 m	Complies, site is inland.
Existing water supply bore.	20 m	NR	Complies. None recorded within or within 20 m of the site boundaries.
Property boundary	1.5 m	1.5	Complies. Including proposed subdivision boundaries.
Winter groundwater table	0.9 m	0.9 m	Complies.
Topography			Ok – chosen disposal areas are flat and level to <15°.
Cut off drain required?			No.
Discharge Consent Required?			No.
	TP58	**NZS1547**	
Cumulative Effects			
Biological Oxygen Demand	≤20 g/m^3		Complies – secondary treatment.
Total Suspended Solids	≤30 g/m^3		Complies – secondary treatment.
Total Nitrogen	10 – 30 g/m^3	15 – 75 g/m^3	Complies – secondary treatment.
Phosphorous	NR	4 – 10 g/m^3	Complies – secondary treatment.
Ammonia	NR	Negligible	Complies – secondary treatment.
Nitrites/ Nitrates	NR	15 – 45 g/m^3	Complies – secondary treatment.
Conclusion: Effects are less than minor on the environment.			

1. AEE based on proposed secondary treated effluent.
2. Northland Regional Plan Table 9.
3. Based on the recommendations of this report and Drawing No. 100.
4. Including any formed road with kerb and channel, and water-table drain that is down-slope of the disposal area.
5. River, lake, stream, pond, dam, or natural wetland.

AEP Annual Exceedance Probability.
NR No Requirement.

Table 15: Operative FNDC Subdivision Stormwater Assessment Criteria, to rule 13.10.4

Assessment Criteria	Comments
(a) Whether the application complies with any regional rules relating to any water or discharge permits required under the Act, and with any resource consent issued to the District Council in relation to any urban drainage area stormwater management plan or similar plan.	Complies.
(b) Whether the application complies with the provisions of the Council's "Engineering Standards and Guidelines" (2004) - Revised March 2009 (to be used in conjunction with NZS 4404:2004).	Concept design complies and has adopted latest FNDC engineering standards (2023) for runoff curves and proposed area within all undeveloped lots will be attenuated to 80 % of pre-development levels for specified design storms by FNDC standards and NRP. Existing development Lot 1 runoff below permitted activity threshold.
(c) Whether the application complies with the Far North District Council Strategic Plan - Drainage.	Complies.
(d) The degree to which Low Impact Design principles have been used to reduce site impermeability and to retain natural permeable areas.	Proposed impervious areas within subdivision proposal are limited to necessity only. Proposed impervious area (RoW Access) optimised to 3m. All impervious areas to attenuated by on site storage devices.
(e) The adequacy of the proposed means of disposing of collected stormwater from the roof of all potential or existing buildings and from all impervious surfaces.	Low impact design adopted – attenuation within on-site tanks for undeveloped proposed lot 1. Efficient and controlled discharge outlets. Existing roadside drains to be adopted where possible. Current stormwater management devices on lot 1 are in good condition with no additional impervious surfaces proposed.
(f) The adequacy of any proposed means for screening out litter, the capture of chemical spillages, the containment of contamination from roads and paved areas, and of siltation.	Stormwater quality devices included in design to accommodate a rural residential subdivision.
(g) The practicality of retaining open natural waterway systems for stormwater disposal in preference to piped or canal systems and adverse effects on existing waterways.	Surface drainage preferred and adopted where practical and safe. Subject site is within a rural environment with an OLFP centred laterally through lot 2 and laterally adjacent along northern boundary of lot 2. No adverse effects anticipated on downstream environment.
(h) Whether there is sufficient capacity available in the Council's outfall stormwater system to cater for increased run-off from the proposed allotments.	No connection to public stormwater proposed.
(i) Where an existing outfall is not capable of accepting increased run-off, the adequacy of proposals and solutions for disposing of run-off.	NA.
(j) The necessity to provide on-site retention basins to contain surface run-off where the capacity of the outfall is incapable of accepting flows, and where the outfall has limited capacity, any need to restrict the rate of discharge from the subdivision to the same rate of discharge that existed on the land before the subdivision takes place.	Attenuation provided through storage tanks. Furthermore, an existing pond adjacent to the northern boundary of Lot 3 DP 191914 will provide detention to limit flow to the downstream outfall in conjunction with the already

	serving OLFP. Receiving catchment remains the same.
(k) Any adverse effects of the proposed subdivision on drainage to, or from, adjoining properties and mitigation measures proposed to control any adverse effects.	No adverse effects anticipated on neighbouring properties or downstream environment.
(l) In accordance with sustainable management practices, the importance of disposing of stormwater by way of gravity pipelines. However, where topography dictates that this is not possible, the adequacy of proposed pumping stations put forward as a satisfactory alternative.	All devices adopt and are designed for gravity flows.
(m) The extent to which it is proposed to fill contrary to the natural fall of the country to obtain gravity outfall; the practicality of obtaining easements through adjoining owners' land to other outfall systems; and whether filling or pumping may constitute a satisfactory alternative.	No fill is required for the stormwater management purpose.
(n) For stormwater pipes and open waterway systems, the provision of appropriate easements in favour of either the registered user or in the case of the Council, easements in gross, to be shown on the survey plan for the subdivision, including private connections passing over other land protected by easements in favour of the user.	All stormwater pipes and devices are within proposed easements as shown in scheme plan.
(o) Where an easement is defined as a line, being the centre line of a pipe already laid, the effect of any alteration of its size and the need to create a new easement.	NA.
(p) For any stormwater outfall pipeline through a reserve, the prior consent of the Council, and the need for an appropriate easement.	NA.
(q) The need for and extent of any financial contributions to achieve the above matters.	TBC.
(r) The need for a local purpose reserve to be set aside and vested in the Council as a site for any public utility required to be provided.	NA.

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APPENDIX D

Stormwater Calculations

Project Ref:	C0492	**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	33 REDCLIFFS ROAD, KERIKERI		
Design Case:	CONCEPT FUTURE DEVELOPMENT	**50 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	7 August 2024 REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).
PRE-DEVELOPMENT RUNOFF IS FACTORED BY 80% TO SUIT FNDC STANDARDS
RUNOFF COEFFIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A			
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	
EX. PERVIOUS	500	0.59	PASTURE
TOTAL	**500**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	200	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
TOTAL	**500**	TYPE C	

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION

50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	65.2	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	78.24	mm/hr

* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.

PRE AND POST-DEVELOPMENT RUNOFF, 50%AEP WITH CC, VARIOUS DURATIONS

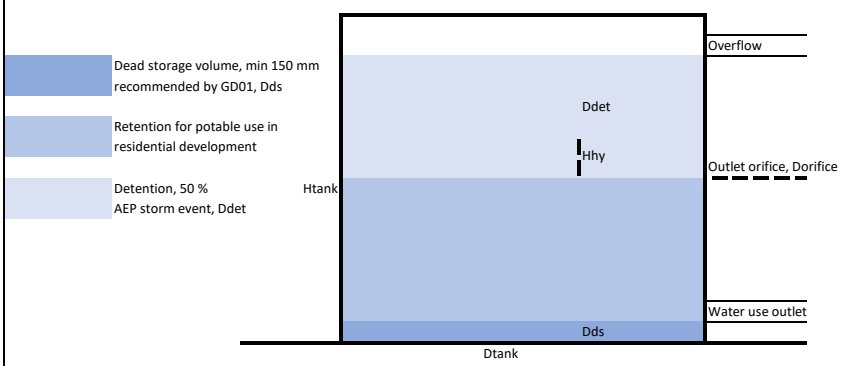
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	65.20	1.2	78.24	9.87	5.34	4.27	*Critical duration (time of concentration) for the catchments is 10min*
20	47.20	1.2	56.64	7.14	4.64	3.71	
30	38.90	1.2	46.68	5.89	3.83	3.06	
60	27.80	1.2	33.36	4.21	2.73	2.19	
120	19.60	1.2	23.52	2.97	1.93	1.54	*Pre-dev calculated on Intensity without CC factor*
360	10.70	1.2	12.84	1.62	1.05	0.84	
720	6.96	1.2	8.35	1.05	0.68	0.55	
1440	4.36	1.2	5.23	0.66	0.43	0.34	
2880	2.61	1.2	3.13	0.39	0.26	0.21	
4320	1.88	1.2	2.26	0.28	0.18	0.15	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	3.61	6.26	0.67	0.67	5.59	3356	*select largest required storage , regardless of duration, to avoid overflow*
20	2.61	4.53	1.10	0.67	3.86	4638	
30	2.15	3.73	0.91	0.67	3.07	5522	
60	1.54	2.67	0.65	0.67	2.00	7208	
120	1.08	1.88	0.46	0.67	1.22	8749	
360	0.59	1.03	0.25	0.67	0.36	7791	
720	0.39	0.67	0.16	0.67	0.00	72	
1440	0.24	0.42	0.10	0.67	No Att. Req.	0	
2880	0.14	0.25	0.06	0.67	No Att. Req.	0	
4320	0.10	0.18	0.04	0.67	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	8.749	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66	m	No. of Tanks 2
TANK AREA, Atank	21.04	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	52604	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.42	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.57	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00067	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.21	m	
AREA OF ORIFICE, Aorifice	5.32E-04	m2	
ORIFICE DIAMETER, Dorifice	26	mm	
VELOCITY AT ORIFICE	2.86	m/s	At max. head level

Project Ref:	C0492		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	33 REDCLIFFS ROAD, KERIKERI			
Design Case:	CONCEPT FUTURE DEVELOPMENT		**20 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	7 August 2024	REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).
PRE-DEVELOPMENT RUNOFF IS FACTORED BY 80% TO SUIT FNDC STANDARDS
RUNOFF COEFFIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0	
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	PASTURE
EX. PERVIOUS	500	0.59	
TOTAL	**500**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	200	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**500**	TYPE C	

RAINFALL INTENSITY, 20% AEP, 10MIN DURATION

20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	84.4	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
20 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	101.3	mm/hr

* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.

PRE AND POST-DEVELOPMENT RUNOFF, 20%AEP WITH CC, VARIOUS DURATIONS

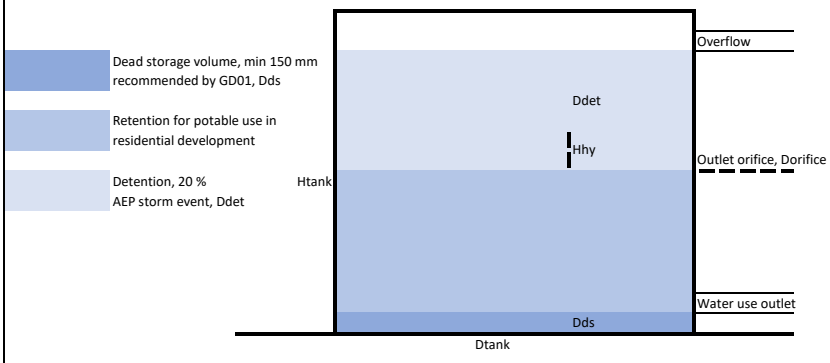
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	84.40	1.2	101.28	12.77	6.92	5.53	*Critical duration (time of concentration) for the catchments is 10min*
20	61.20	1.2	73.44	9.26	6.02	4.81	
30	50.60	1.2	60.72	7.66	4.98	3.98	
60	36.20	1.2	43.44	5.48	3.56	2.85	
120	25.50	1.2	30.60	3.86	2.51	2.01	*Pre-dev calculated on Intensity without CC factor*
360	13.90	1.2	16.68	2.10	1.37	1.09	
720	9.12	1.2	10.94	1.38	0.90	0.72	
1440	5.72	1.2	6.86	0.87	0.56	0.45	
2880	3.43	1.2	4.12	0.52	0.34	0.27	
4320	2.48	1.2	2.98	0.38	0.24	0.20	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	4.67	8.10	0.86	0.86	7.24	4344	*select largest required storage , regardless of duration, to avoid overflow*
20	3.39	5.88	2.63	0.86	5.01	6015	
30	2.80	4.86	2.18	0.86	3.99	7191	
60	2.00	3.48	1.56	0.86	2.61	9405	
120	1.41	2.45	1.10	0.86	1.59	11414	
360	0.77	1.33	0.60	0.86	0.47	10188	
720	0.50	0.88	0.39	0.86	0.01	551	
1440	0.32	0.55	0.25	0.86	No Att. Req.	0	
2880	0.19	0.33	0.15	0.86	No Att. Req.	0	
4320	0.14	0.24	0.11	0.86	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	11.414	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66	m	No. of Tanks 2
TANK AREA, Atank	21.04	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	52604	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.54	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.69	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00086	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.27	m	
AREA OF ORIFICE, Aorifice	6.03E-04	m2	
ORIFICE DIAMETER, Dorifice	28	mm	
VELOCITY AT ORIFICE	3.26	m/s	At max. head level

Project Ref:	C0492		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	33 REDCLIFFS ROAD, KERIKERI			
Design Case:	CONCEPT FUTURE DEVELOPMENT		**10 % AEP STORM EVENT, TO PRE-DEVELOPMENT FLOW**	
Date:	7 August 2024	REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).
THE 10% AEP SCENARIO IS PROVIDED TO SATISFY FNDC DISTRICT PLAN RULE 13.7.3.4. PRE-DEVELOPMENT RUNOFF REMAINS UNFACTORED IN THIS SCENARIO.
RUNOFF COEFFIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0	
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	
EX. PERVIOUS	500	0.59	PASTURE
0	0	0	
TOTAL	**500**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	200	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**500**	TYPE C	

RAINFALL INTENSITY, 10% AEP, 10MIN DURATION

10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	98.5	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
10 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	118.2	mm/hr

* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.

PRE AND POST-DEVELOPMENT RUNOFF, 10%AEP WITH CC, VARIOUS DURATIONS

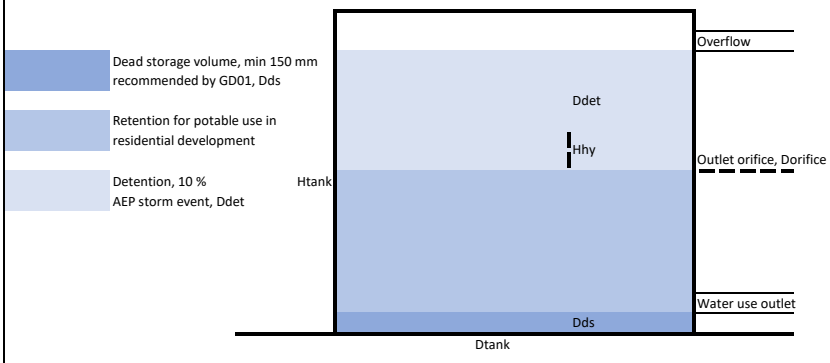
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s		COMMENTS
10	98.50	1.2	118.20	14.91	8.07		*Critical duration (time of concentration) for the catchments is 10min*
20	71.50	1.2	85.80	10.82	7.03		
30	59.20	1.2	71.04	8.96	5.82		
60	42.40	1.2	50.88	6.42	4.17		
120	29.90	1.2	35.88	4.52	2.94		*Pre-dev calculated on Intensity without CC factor*
360	16.40	1.2	19.68	2.48	1.61		
720	10.70	1.2	12.84	1.62	1.05		
1440	6.74	1.2	8.09	1.02	0.66		
2880	4.04	1.2	4.85	0.61	0.40		
4320	2.92	1.2	3.50	0.44	0.29		

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	5.45	9.46	2.62	2.62	6.83	4101	*select largest required storage , regardless of duration, to avoid overflow*
20	3.96	6.86	3.07	2.62	4.24	5091	
30	3.28	5.68	2.55	2.62	3.06	5512	
60	2.35	4.07	1.82	2.62	1.45	5217	
120	1.65	2.87	1.29	2.62	0.25	1794	
360	0.91	1.57	0.71	2.62	No Att. Req.	0	
720	0.59	1.03	0.46	2.62	No Att. Req.	0	
1440	0.37	0.65	0.29	2.62	No Att. Req.	0	
2880	0.22	0.39	0.17	2.62	No Att. Req.	0	
4320	0.16	0.28	0.13	2.62	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	5.512	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66	m	No. of Tanks 2
TANK AREA, Atank	21.04	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	52604	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.26	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.41	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00262	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.13	m	
AREA OF ORIFICE, Aorifice	2.64E-03	m2	
ORIFICE DIAMETER, Dorifice	58	mm	
VELOCITY AT ORIFICE	2.27	m/s	At max. head level

Project Ref:	C0492	**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	33 REDCLIFFS ROAD, KERIKERI		
Design Case:	CONCEPT FUTURE DEVELOPMENT	**1 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	7 August 2024 REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).
PRE-DEVELOPMENT RUNOFF IS FACTORED BY 80% TO SUIT FNDC STANDARDS
RUNOFF COEFFIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0	
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	
EX. PERVIOUS	500	0.59	PASTURE
0	0	0	
TOTAL	**500**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	200	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**500**	TYPE C	

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION

1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	147.0	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
1 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	176.4	mm/hr

* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.

PRE AND POST-DEVELOPMENT RUNOFF, 1%AEP WITH CC, VARIOUS DURATIONS

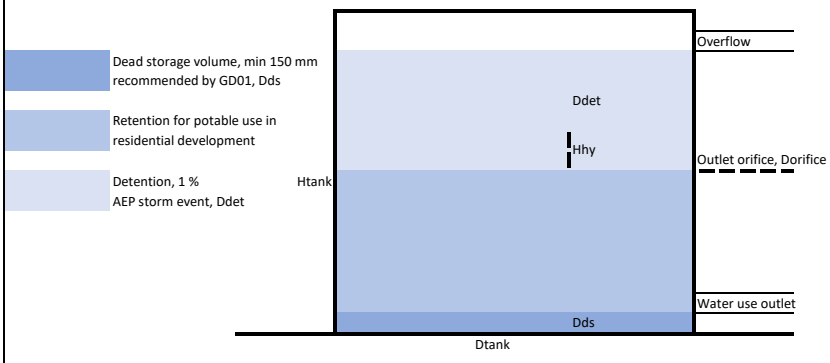
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	147.00	1.2	176.40	22.25	12.05	9.64	*Critical duration (time of concentration) for the catchments is 10min*
20	107.00	1.2	128.40	16.19	10.52	8.42	
30	88.70	1.2	106.44	13.42	8.72	6.98	
60	63.90	1.2	76.68	9.67	6.28	5.03	
120	45.20	1.2	54.24	6.84	4.44	3.56	*Pre-dev calculated on Intensity without CC factor*
360	24.90	1.2	29.88	3.77	2.45	1.96	
720	16.40	1.2	19.68	2.48	1.61	1.29	
1440	10.30	1.2	12.36	1.56	1.01	0.81	
2880	6.21	1.2	7.45	0.94	0.61	0.49	
4320	4.50	1.2	5.40	0.68	0.44	0.35	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	8.13	14.11	1.50	1.50	12.61	7566	*Selected Tank Outflow is selected for critical duration (time of concentration). In this case = 10min*
20	5.92	10.27	2.50	1.50	8.77	10523	
30	4.91	8.52	2.07	1.50	7.01	12623	
60	3.54	6.13	1.49	1.50	4.63	16674	
120	2.50	4.34	1.05	1.50	2.84	20423	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	1.38	2.39	0.58	1.50	0.89	19175	
720	0.91	1.57	0.38	1.50	0.07	3099	
1440	0.57	0.99	0.24	1.50	No Att. Req.	0	
2880	0.34	0.60	0.14	1.50	No Att. Req.	0	
4320	0.25	0.43	0.11	1.50	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	20.423	m3	Select largest storage as per analysis	
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank	
TANK DIAMETER, Dtank	3.66	m	No. of Tanks	2
TANK AREA, Atank	21.04	m2	Area of ONE tank	
TANK MAX STORAGE VOLUME, Vtank	52604	litres		
REQUIRED STORAGE HEIGHT, Ddet	0.97	m	Below overflow	
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum	
TOTAL WATER DEPTH REQUIRED	1.12	m		
SELECTED TANK OUTFLOW, Qout, l/s	0.00150	m3/s	Selected tank outflow	
AVERAGE HYDRAULIC HEAD, Hhy	0.49	m		
AREA OF ORIFICE, Aorifice	7.85E-04	m2		
ORIFICE DIAMETER, Dorifice	32	mm		
VELOCITY AT ORIFICE	4.36	m/s	At max. head level	

Project Ref:	C0492	**STORMWATER DISPERSION PIPE/ TRENCH**	geologix consulting engineers
Project Address:	33 REDCLIFFS ROAD, KERIKERI		
Design Case:	CONCEPT FUTURE DEVELOPMENT	**DISCHARGE DEVICE - LEVEL SPREADER OR TRENCH**	
Date:	7 August 2024 REV 1		

DESIGN BASED ON REFERENCED DEVELOPMENT PLANS TO PROVIDE A MINIMUM LENGTH OF ABOVE OR BELOW GROUND STORMWATER TANK OVERFLOW DISCHARGE DISPERSION DEVICE. IN GENERAL ACCORDANCE WITH MODIFIED RATIONAL METHOD AND AUCKLAND COUNCIL TR2013/018.

DESIGN STORM EVENT **1%** AEP EVENT

SLOPE BETWEEN SOURCE & DISPERSION DEVICE

ELEVATION	h	CHAINAGE, x	Δ x	h bar	Δ A
m	m	m	m	m	m2
26	0	0	0	0	0
24.5	1.5	8	8	0.75	6
	TOTALS	8	8		6
	SLOPE, Sc	0.188	m/m		

MANNINGS PIPE FLOW - INCOMING PIPE

Dia, m	d/D	α, rad	P, m	A, m^2	R	1:S	n	V, m/s	Q, m^3/s	Q, l/s	
0.1	0.000	6.283	0.0000	0.0000	0.000	5.33333333	0.009	0.000	0.0000	0.000	**0 % full**
0.100	0.050	5.381	0.0451	0.0001	0.003	5.333333333	0.0090	1.057	0.0002	0.155	
0.100	0.100	4.996	0.0644	0.0004	0.006	5.333333333	0.0090	1.650	0.0007	0.675	
0.100	0.150	4.692	0.0795	0.0007	0.009	5.333333333	0.0090	2.126	0.0016	1.570	
0.100	0.200	4.429	0.0927	0.0011	0.012	5.333333333	0.0090	2.530	0.0028	2.829	
0.100	0.250	4.189	0.1047	0.0015	0.015	5.333333333	0.0090	2.882	0.0044	4.426	
0.100	0.300	3.965	0.1159	0.0020	0.017	5.333333333	0.0090	3.193	0.0063	6.327	
0.100	0.350	3.751	0.1266	0.0024	0.019	5.333333333	0.0090	3.468	0.0085	8.495	
0.100	0.400	3.544	0.1369	0.0029	0.021	5.333333333	0.0090	3.711	0.0109	10.887	
0.100	0.450	3.342	0.1471	0.0034	0.023	5.333333333	0.0090	3.926	0.0135	13.457	
0.100	0.500	3.142	0.1571	0.0039	0.025	5.333333333	0.0090	4.114	0.0162	16.154	**50 % full**
0.100	0.550	2.941	0.1671	0.0044	0.026	5.333333333	0.0090	4.275	0.0189	18.923	
0.100	0.600	2.739	0.1772	0.0049	0.028	5.333333333	0.0090	4.411	0.0217	21.706	
0.100	0.650	2.532	0.1875	0.0054	0.029	5.333333333	0.0090	4.522	0.0244	24.438	
0.100	0.700	2.319	0.1982	0.0059	0.030	5.333333333	0.0090	4.606	0.0270	27.049	
0.100	0.750	2.094	0.2094	0.0063	0.030	5.333333333	0.0090	4.663	0.0295	29.461	
0.100	0.800	1.855	0.2214	0.0067	0.030	5.333333333	0.0090	4.688	0.0316	31.580	
0.100	0.850	1.591	0.2346	0.0071	0.030	5.333333333	0.0090	4.679	0.0333	33.291	
0.100	0.900	1.287	0.2498	0.0074	0.030	5.333333333	0.0090	4.625	0.0344	34.434	
0.100	0.950	0.902	0.2691	0.0077	0.029	5.333333333	0.0090	4.504	0.0347	34.715	
0.100	1.000	0.000	0.3142	0.0079	0.025	5.333333333	0.0090	4.114	0.0323	32.308	**Flowing full**

DISPERSION SPECIFICATION

INCOMING PIPE PROPERTIES:

TANK OUTFLOW, 1 % AEP	14.11	l/s		
MAXIMUM PIPE FLOW	34.72	l/s		
SUFFICIENT CAPACITY IN PIPE	YES			
LONGITUDINAL SLOPE	0.188	m/m		
DESIGN VELOCITY, Dv	4.688	m/s		

LEVEL SPREADER SPECIFICATIONS:

PIPE DIAMETER, m	0.20	m		
MANNINGS PIPE ROUGHNESS	0.009			
NUMBER OF ORIFICES	52	No.		
DIA. OF ORIFICE, D	20	mm		
ORIFICE INTERVALS, C/C	200	mm		
DISPERSION PIPE LENGTH, L	**10.2**	**m**		

ORIFICE DESIGN FLOW CHECK:

AREA OF SINGLE ORIFICE, A	0.00031	m2		
FLOW OUT OF 1 ORIFICE	0.000272829	m3/s	0.27 l/s	
FLOW OUT OF ALL ORIFICES	0.01418713	m3/s	14.19 l/s	**DESIGN OK**
VELOCITY FROM SINGLE ORIFICE	0.87	m/s		

BROAD CRESTED WEIR DESIGN FLOW CHECK:

FLOW DEPTH, h	0.1	m		
BASE WIDTH = L	10.2	m		
FLOW AREA	1.02	m2		
WEIR FLOW	0.01903	m3/s	19.03 l/s	**DESIGN OK**
WEIR VELOCITY	0.019	m/s		

INCOMING PIPE & SPREADER SUMARY:

	LOT 1	
INCOMING PIPE DIAMETER, m	0.100	m
SPREADER PIPE DIAMETER, m	0.200	m
MANNINGS PIPE ROUGHNESS	0.009	
NUMBER OF ORIFICES	52	No.
DIA. OF ORIFICE, D	20	mm
ORIFICE INTERVALS, C/C	200	mm
DISPERSION PIPE LENGTH, L	**10.2**	**m**

Project Ref:	C0492	**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	33 REDCLIFFS ROAD, KERIKERI		
Design Case:	Accessway for Lot 2	**50 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	9 August 2024 REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).
PRE-DEVELOPMENT RUNOFF IS FACTORED BY 80% TO SUIT FNDC STANDARDS
RUNOFF COEFFIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A			
IMPERVIOUS B	205	0.59	PASTURE
IMPERVIOUS C	147	0.59	PASTURE
EX. PERVIOUS	293	0.59	PASTURE
TOTAL	**645**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	440	0.83	DRIVEWAY - METAL
OFFSET	205	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
TOTAL	**645**	TYPE C	

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION

50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	65.2	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	78.24	mm/hr

* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.

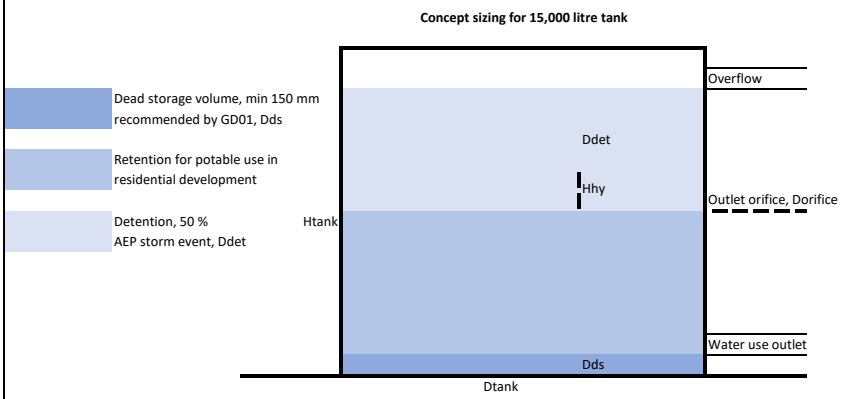
PRE AND POST-DEVELOPMENT RUNOFF, 50%AEP WITH CC, VARIOUS DURATIONS

DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	65.20	1.2	78.24	11.63	6.89	5.51	*Critical duration (time of concentration) for the catchments is 10min*
20	47.20	1.2	56.64	8.42	5.99	4.79	
30	38.90	1.2	46.68	6.94	4.93	3.95	
60	27.80	1.2	33.36	4.96	3.53	2.82	
120	19.60	1.2	23.52	3.50	2.49	1.99	*Pre-dev calculated on Intensity without CC factor*
360	10.70	1.2	12.84	1.91	1.36	1.09	
720	6.96	1.2	8.35	1.24	0.88	0.71	
1440	4.36	1.2	5.23	0.78	0.55	0.44	
2880	2.61	1.2	3.13	0.47	0.33	0.26	
4320	1.88	1.2	2.26	0.34	0.24	0.19	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	3.70	7.94	1.82	1.82	6.12	3673	*select largest required storage , regardless of duration, to avoid overflow*
20	2.68	5.75	2.11	1.82	3.93	4716	
30	2.21	4.74	1.74	1.82	2.92	5255	
60	1.58	3.38	1.24	1.82	1.57	5646	
120	1.11	2.39	0.88	1.82	0.57	4105	
360	0.61	1.30	0.48	1.82	No Att. Req.	0	
720	0.39	0.85	0.31	1.82	No Att. Req.	0	
1440	0.25	0.53	0.20	1.82	No Att. Req.	0	
2880	0.15	0.32	0.12	1.82	No Att. Req.	0	
4320	0.11	0.23	0.08	1.82	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION

TOTAL STORAGE REQUIRED	5.646	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.45	m	Concept sizing for 15,000 litre tank
TANK DIAMETER, Dtank	2.8	m	No. of Tanks 1
TANK AREA, Atank	6.16	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	15086	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.92	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.07	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00182	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.46	m	
AREA OF ORIFICE, Aorifice	9.77E-04	m2	
ORIFICE DIAMETER, Dorifice	35	mm	
VELOCITY AT ORIFICE	4.24	m/s	At max. head level

Project Ref:	C0492		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	33 REDCLIFFS ROAD, KERIKERI			
Design Case:	Accessway for Lot 2		**20 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	9 August 2024	REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).
PRE-DEVELOPMENT RUNOFF IS FACTORED BY 80% TO SUIT FNDC STANDARDS
RUNOFF COEFFIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0	
IMPERVIOUS B	205	0.59	PASTURE
IMPERVIOUS C	147	0.59	PASTURE
EX. PERVIOUS	293	0.59	
TOTAL	**645**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	440	0.83	DRIVEWAY - METAL
OFFSET	205	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**645**	TYPE C	

RAINFALL INTENSITY, 20% AEP, 10MIN DURATION

20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	84.4	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
20 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	101.3	mm/hr

* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.

PRE AND POST-DEVELOPMENT RUNOFF, 20%AEP WITH CC, VARIOUS DURATIONS

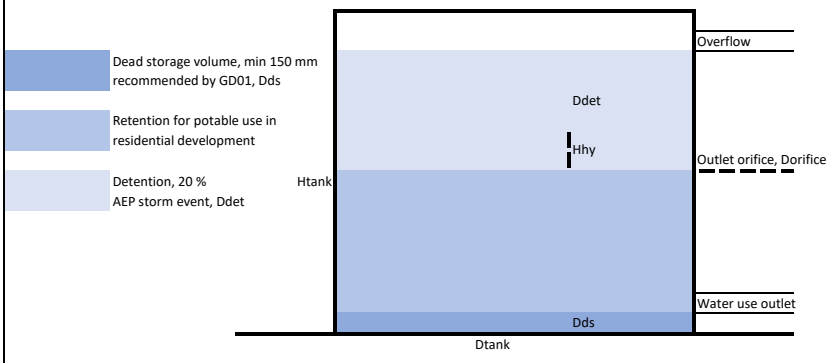
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	84.40	1.2	101.28	15.06	8.92	7.14	*Critical duration (time of concentration) for the catchments is 10min*
20	61.20	1.2	73.44	10.92	7.76	6.21	
30	50.60	1.2	60.72	9.03	6.42	5.13	
60	36.20	1.2	43.44	6.46	4.59	3.67	
120	25.50	1.2	30.60	4.55	3.23	2.59	*Pre-dev calculated on Intensity without CC factor*
360	13.90	1.2	16.68	2.48	1.76	1.41	
720	9.12	1.2	10.94	1.63	1.16	0.93	
1440	5.72	1.2	6.86	1.02	0.73	0.58	
2880	3.43	1.2	4.12	0.61	0.44	0.35	
4320	2.48	1.2	2.98	0.44	0.31	0.25	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	4.79	10.27	2.35	2.35	7.92	4754	*select largest required storage , regardless of duration, to avoid overflow*
20	3.47	7.45	4.29	2.35	5.10	6119	
30	2.87	6.16	3.55	2.35	3.81	6857	
60	2.05	4.41	2.54	2.35	2.06	7402	
120	1.45	3.10	1.79	2.35	0.75	5426	
360	0.79	1.69	0.97	2.35	No Att. Req.	0	
720	0.52	1.11	0.64	2.35	No Att. Req.	0	
1440	0.32	0.70	0.40	2.35	No Att. Req.	0	
2880	0.19	0.42	0.24	2.35	No Att. Req.	0	
4320	0.14	0.30	0.17	2.35	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 15,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	7.402	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.45	m	Concept sizing for 15,000 litre tank
TANK DIAMETER, Dtank	2.8	m	No. of Tanks 1
TANK AREA, Atank	6.16	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	15086	litres	
REQUIRED STORAGE HEIGHT, Ddet	1.20	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.35	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00235	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.60	m	
AREA OF ORIFICE, Aorifice	1.10E-03	m2	
ORIFICE DIAMETER, Dorifice	37	mm	
VELOCITY AT ORIFICE	4.86	m/s	At max. head level

Project Ref:	C0492		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	33 REDCLIFFS ROAD, KERIKERI			
Design Case:	Accessway for Lot 2		**10 % AEP STORM EVENT, TO PRE-DEVELOPMENT FLOW**	
Date:	9 August 2024	REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).
THE 10% AEP SCENARIO IS PROVIDED TO SATISFY FNDC DISTRICT PLAN RULE 13.7.3.4. PRE-DEVELOPMENT RUNOFF REMAINS UNFACTORED IN THIS SCENARIO.
RUNOFF COEFFIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0	
IMPERVIOUS B	205	0.59	PASTURE
IMPERVIOUS C	147	0.59	PASTURE
EX. PERVIOUS	293	0.59	PASTURE
0	0	0	
TOTAL	**645**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	440	0.83	DRIVEWAY - METAL
OFFSET	205	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**645**	TYPE C	

RAINFALL INTENSITY, 10% AEP, 10MIN DURATION

10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	98.5	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
10 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	118.2	mm/hr

* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.

PRE AND POST-DEVELOPMENT RUNOFF, 10%AEP WITH CC, VARIOUS DURATIONS

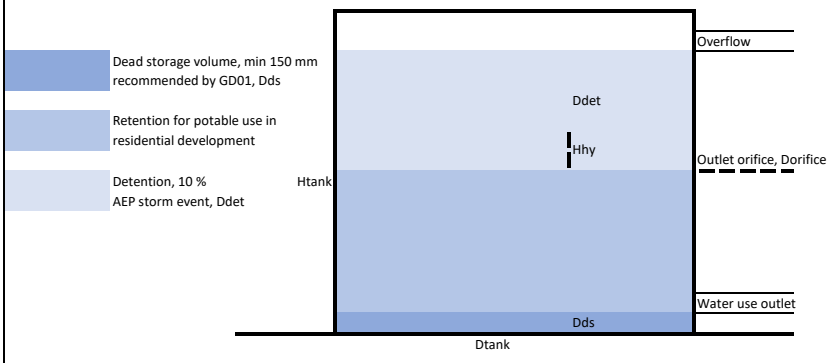
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s		COMMENTS
10	98.50	1.2	118.20	17.58	10.41		*Critical duration (time of concentration) for the catchments is 10min*
20	71.50	1.2	85.80	12.76	9.07		
30	59.20	1.2	71.04	10.56	7.51		
60	42.40	1.2	50.88	7.57	5.38		
120	29.90	1.2	35.88	5.34	3.79		*Pre-dev calculated on Intensity without CC factor*
360	16.40	1.2	19.68	2.93	2.08		
720	10.70	1.2	12.84	1.91	1.36		
1440	6.74	1.2	8.09	1.20	0.85		
2880	4.04	1.2	4.85	0.72	0.51		
4320	2.92	1.2	3.50	0.52	0.37		

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	5.59	11.99	4.83	4.83	7.17	4299	*select largest required storage , regardless of duration, to avoid overflow*
20	4.06	8.70	5.01	4.83	3.88	4654	
30	3.36	7.21	4.15	4.83	2.38	4286	
60	2.40	5.16	2.97	4.83	0.34	1209	
120	1.70	3.64	2.10	4.83	No Att. Req.	0	
360	0.93	2.00	1.15	4.83	No Att. Req.	0	
720	0.61	1.30	0.75	4.83	No Att. Req.	0	
1440	0.38	0.82	0.47	4.83	No Att. Req.	0	
2880	0.23	0.49	0.28	4.83	No Att. Req.	0	
4320	0.17	0.36	0.20	4.83	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 15,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	4.654	m3	Select largest storage as per analysis	
TANK HEIGHT, Htank	2.45	m	Concept sizing for 15,000 litre tank	
TANK DIAMETER, Dtank	2.8	m	No. of Tanks	1
TANK AREA, Atank	6.16	m2	Area of ONE tank	
TANK MAX STORAGE VOLUME, Vtank	15086	litres		
REQUIRED STORAGE HEIGHT, Ddet	0.76	m	Below overflow	
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum	
TOTAL WATER DEPTH REQUIRED	0.91	m		
SELECTED TANK OUTFLOW, Qout, l/s	0.00483	m3/s	Selected tank outflow	
AVERAGE HYDRAULIC HEAD, Hhy	0.38	m		
AREA OF ORIFICE, Aorifice	2.86E-03	m2		
ORIFICE DIAMETER, Dorifice	60	mm		
VELOCITY AT ORIFICE	3.85	m/s	At max. head level	

Project Ref:	C0492		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	33 REDCLIFFS ROAD, KERIKERI			
Design Case:	Accessway for Lot 2		**1 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT**	
Date:	9 August 2024	REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).
PRE-DEVELOPMENT RUNOFF IS FACTORED BY 80% TO SUIT FNDC STANDARDS
RUNOFF COEFFIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0	
IMPERVIOUS B	205	0.59	PASTURE
IMPERVIOUS C	147	0.59	PASTURE
EX. PERVIOUS	293	0.59	PASTURE
0	0	0	
TOTAL	**645**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	440	0.83	DRIVEWAY - METAL
OFFSET	205	0.83	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**645**	TYPE C	

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION

1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	147.0	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
1 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	176.4	mm/hr

* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.

PRE AND POST-DEVELOPMENT RUNOFF, 1%AEP WITH CC, VARIOUS DURATIONS

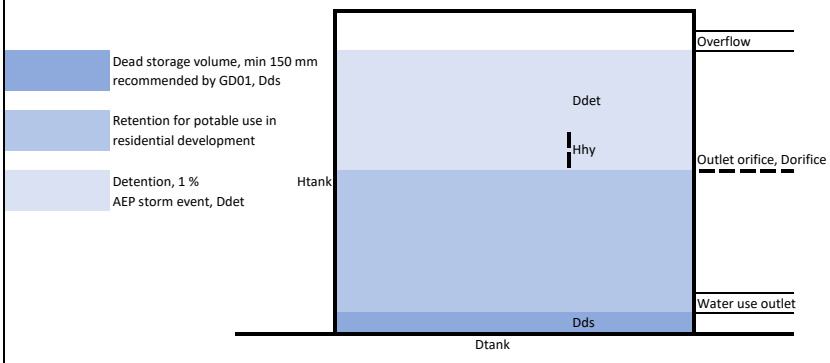
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	147.00	1.2	176.40	26.23	15.54	12.43	*Critical duration (time of concentration) for the catchments is 10min*
20	107.00	1.2	128.40	19.09	13.57	10.86	
30	88.70	1.2	106.44	15.83	11.25	9.00	
60	63.90	1.2	76.68	11.40	8.11	6.48	
120	45.20	1.2	54.24	8.07	5.73	4.59	*Pre-dev calculated on Intensity without CC factor*
360	24.90	1.2	29.88	4.44	3.16	2.53	
720	16.40	1.2	19.68	2.93	2.08	1.66	
1440	10.30	1.2	12.36	1.84	1.31	1.05	
2880	6.21	1.2	7.45	1.11	0.79	0.63	
4320	4.50	1.2	5.40	0.80	0.57	0.46	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	8.34	17.89	4.09	4.09	13.80	8281	*Selected Tank Outflow is selected for critical duration (time of concentration). In this case = 10min*
20	6.07	13.03	4.79	4.09	8.93	10718	
30	5.03	10.80	3.97	4.09	6.70	12067	
60	3.62	7.78	2.86	4.09	3.68	13265	
120	2.56	5.50	2.02	4.09	1.41	10140	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	1.41	3.03	1.11	4.09	No Att. Req.	0	
720	0.93	2.00	0.73	4.09	No Att. Req.	0	
1440	0.58	1.25	0.46	4.09	No Att. Req.	0	
2880	0.35	0.76	0.28	4.09	No Att. Req.	0	
4320	0.26	0.55	0.20	4.09	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 15,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	13.265	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.45	m	Concept sizing for 15,000 litre tank
TANK DIAMETER, Dtank	2.8	m	No. of Tanks 1
TANK AREA, Atank	6.16	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	15086	litres	
REQUIRED STORAGE HEIGHT, Ddet	2.15	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	2.30	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00409	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	1.08	m	
AREA OF ORIFICE, Aorifice	1.44E-03	m2	
ORIFICE DIAMETER, Dorifice	43	mm	
VELOCITY AT ORIFICE	6.50	m/s	At max. head level

HIRDS V4 Intensity-Duration-Frequency Results
Sitename: Custom Location
Coordinate system: WGS84
Longitude: 173.9639
Latitude: -35.1924

DDF Mode Parameters:	c	d	e	f	g	h	i
Values:	0.00227905	0.5048629	-0.0171481	-0.00340679	0.25418822	-0.0117019	3.2351053

Example:	Duration (hrs)	ARI (yrs)	x	y	Rainfall Rate (mm/hr)
	24	100	3.17805383	4.60014923	10.31891644

Rainfall intensities (mm/hr) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	59.5	43	35.5	25.4	17.8	9.71	6.33	4	2.4	1.7	1.3	1.1
2	0.5	65.2	47.2	38.9	27.8	19.6	10.7	6.96	4.4	2.6	1.9	1.5	1.21
5	0.2	84.4	61.2	50.6	36.2	25.5	13.9	9.12	5.7	3.4	2.5	1.9	1.6
10	0.1	98.5	71.5	59.2	42.4	29.9	16.4	10.7	6.7	4	2.9	2.3	1.89
20	0.05	113	82	67.9	48.8	34.4	18.9	12.4	7.8	4.7	3.4	2.7	2.19
30	0.033	121	88.3	73.1	52.5	37.1	20.4	13.4	8.4	5.1	3.7	2.9	2.37
40	0.025	127	92.8	76.8	55.2	39	21.4	14.1	8.9	5.3	3.9	3	2.49
50	0.02	132	96.2	79.7	57.3	40.5	22.3	14.6	9.2	5.5	4	3.2	2.6
60	0.017	136	99.1	82.1	59	41.8	22.9	15.1	9.5	5.7	4.1	3.3	2.68
80	0.013	142	104	85.8	61.8	43.7	24	15.8	10	6	4.3	3.4	2.81
100	0.01	147	107	88.7	63.9	45.2	24.9	16.4	10	6.2	4.5	3.5	2.91
250	0.004	166	121	100	72.4	51.3	28.3	18.6	12	7.1	5.1	4.1	3.34

Intensity standard error (mm/hr) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	7.7	5	3.6	2.5	1.7	1.1	0.79	0.6	0.4	0.3	0.2	0.2
2	0.5	8.4	5.5	3.9	2.8	1.8	1.2	0.87	0.7	0.4	0.3	0.3	0.22
5	0.2	12	8	5.7	3.8	2.7	1.6	1.2	0.9	0.6	0.4	0.4	0.29
10	0.1	15	11	7.7	4.9	3.5	2.1	1.5	1.1	0.7	0.5	0.4	0.35
20	0.05	19	14	10	6.4	4.7	2.7	1.9	1.3	0.8	0.6	0.5	0.41
30	0.033	22	16	12	7.5	5.6	3.1	2.2	1.5	0.9	0.7	0.5	0.45
40	0.025	24	18	13	8.3	6.3	3.5	2.4	1.6	1	0.7	0.6	0.48
50	0.02	26	20	15	9.1	6.9	3.8	2.6	1.6	1	0.8	0.6	0.51
60	0.017	28	21	16	9.7	7.4	4.1	2.8	1.7	1.1	0.8	0.6	0.53
80	0.013	31	24	18	11	8.3	4.7	3.1	1.9	1.1	0.9	0.7	0.56
100	0.01	33	26	19	12	9	5.1	3.4	2	1.2	0.9	0.7	0.59
250	0.004	46	36	27	16	13	7.4	4.8	2.4	1.5	1.1	0.9	0.73

Rainfall intensities (mm/hr) :: RCP2.6 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	63.7	46.1	38	27.2	19	10.2	6.63	4.1	2.5	1.8	1.4	1.13
2	0.5	69.9	50.6	41.8	29.9	20.9	11.3	7.31	4.6	2.7	1.9	1.5	1.25
5	0.2	90.8	65.8	54.4	39	27.4	14.8	9.61	6	3.6	2.6	2	1.65
10	0.1	106	77.1	63.7	45.7	32.2	17.4	11.3	7.1	4.2	3	2.4	1.95
20	0.05	122	88.5	73.2	52.6	37	20.1	13.1	8.2	4.9	3.5	2.8	2.26
30	0.033	131	95.3	78.9	56.7	39.9	21.7	14.1	8.8	5.3	3.8	3	2.45
40	0.025	138	100	82.9	59.6	42	22.9	14.9	9.3	5.6	4	3.1	2.58
50	0.02	143	104	86.1	61.9	43.7	23.7	15.5	9.7	5.8	4.2	3.3	2.69
60	0.017	147	107	88.6	63.8	45	24.5	16	10	6	4.3	3.4	2.77
80	0.013	154	112	92.7	66.7	47.1	25.6	16.7	11	6.3	4.5	3.5	2.91
100	0.01	159	116	95.9	69	48.7	26.6	17.3	11	6.5	4.7	3.7	3.02
250	0.004	179	131	108	78.2	55.3	30.2	19.7	12	7.4	5.4	4.2	3.46

Rainfall intensities (mm/hr) :: RCP2.6 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	63.7	46.1	38	27.2	19	10.2	6.63	4.1	2.5	1.8	1.4	1.13
2	0.5	69.9	50.6	41.8	29.9	20.9	11.3	7.31	4.6	2.7	1.9	1.5	1.25
5	0.2	90.8	65.8	54.4	39	27.4	14.8	9.61	6	3.6	2.6	2	1.65
10	0.1	106	77.1	63.7	45.7	32.2	17.4	11.3	7.1	4.2	3	2.4	1.95
20	0.05	122	88.5	73.2	52.6	37	20.1	13.1	8.2	4.9	3.5	2.8	2.26
30	0.033	131	95.3	78.9	56.7	39.9	21.7	14.1	8.8	5.3	3.8	3	2.45
40	0.025	138	100	82.9	59.6	42	22.9	14.9	9.3	5.6	4	3.1	2.58
50	0.02	143	104	86.1	61.9	43.7	23.7	15.5	9.7	5.8	4.2	3.3	2.69
60	0.017	147	107	88.6	63.8	45	24.5	16	10	6	4.3	3.4	2.77
80	0.013	154	112	92.7	66.7	47.1	25.6	16.7	11	6.3	4.5	3.5	2.91
100	0.01	159	116	95.9	69	48.7	26.6	17.3	11	6.5	4.7	3.7	3.02
250	0.004	179	131	108	78.2	55.3	30.2	19.7	12	7.4	5.4	4.2	3.46

Rainfall intensities (mm/hr) :: RCP4.5 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	64.8	46.8	38.7	27.6	19.3	10.4	6.71	4.2	2.5	1.8	1.4	1.14
2	0.5	71	51.4	42.5	30.4	21.3	11.4	7.4	4.6	2.7	2	1.5	1.26
5	0.2	92.4	67	55.4	39.7	27.9	15	9.74	6.1	3.6	2.6	2	1.66
10	0.1	108	78.5	64.9	46.5	32.7	17.7	11.5	7.1	4.3	3.1	2.4	1.97
20	0.05	124	90.1	74.6	53.6	37.7	20.4	13.3	8.3	4.9	3.6	2.8	2.28
30	0.033	133	97	80.4	57.7	40.7	22	14.3	8.9	5.3	3.8	3	2.47
40	0.025	140	102	84.5	60.7	42.8	23.2	15.1	9.4	5.6	4.1	3.2	2.61
50	0.02	145	106	87.7	63.1	44.4	24.1	15.7	9.8	5.8	4.2	3.3	2.71
60	0.017	150	109	90.3	64.9	45.8	24.9	16.2	10	6	4.4	3.4	2.8
80	0.013	156	114	94.5	68	48	26.1	17	11	6.3	4.6	3.6	2.94
100	0.01	162	118	97.7	70.3	49.6	27	17.6	11	6.6	4.7	3.7	3.05
250	0.004	182	133	110	79.6	56.3	30.7	20	13	7.5	5.4	4.2	3.49

Rainfall intensities (mm/hr) :: RCP4.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	68.1	49.2	40.7	29.1	20.3	10.8	6.95	4.3	2.5	1.8	1.4	1.16
2	0.5	74.8	54.1	44.7	32	22.4	11.9	7.68	4.7	2.8	2	1.6	1.28
5	0.2	97.5	70.7	58.4	41.8	29.3	15.7	10.1	6.3	3.7	2.7	2.1	1.7
10	0.1	114	82.9	68.5	49.2	34.5	18.5	12	7.4	4.4	3.2	2.5	2.02
20	0.05	131	95.2	78.8	56.6	39.8	21.4	13.8	8.6	5.1	3.7	2.9	2.34
30	0.033	141	103	85	61	42.9	23.1	14.9	9.3	5.5	4	3.1	2.53
40	0.025	148	108	89.3	64.2	45.1	24.4	15.8	9.8	5.8	4.2	3.3	2.68
50	0.02	154	112	92.8	66.7	46.9	25.3	16.4	10	6	4.3	3.4	2.78
60	0.017	158	115	95.5	68.7	48.3	26.1	16.9	11	6.2	4.5	3.5	2.87
80	0.013	166	121	100	71.9	50.6	27.3	17.7	11	6.5	4.7	3.7	3.02
100	0.01	171	125	103	74.4	52.4	28.3	18.3	11	6.8	4.9	3.8	3.13
250	0.004	193	141	117	84.3	59.4	32.2	20.9	13	7.7	5.6	4.4	3.58

Rainfall intensities (mm/hr) :: RCP6.0 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	64.3	46.5	38.4	27.5	19.2	10.3	6.68	4.2	2.5	1.8	1.4	1.14
2	0.5	70.6	51.1	42.2	30.2	21.1	11.4	7.36	4.6	2.7	2	1.5	1.25
5	0.2	91.8	66.5	55	39.4	27.7	14.9	9.69	6	3.6	2.6	2	1.66
10	0.1	107	77.9	64.4	46.2	32.5	17.6	11.4	7.1	4.2	3.1	2.4	1.96
20	0.05	123	89.5	74.1	53.2	37.4	20.3	13.2	8.2	4.9	3.5	2.8	2.27
30	0.033	132	96.3	79.8	57.3	40.4	21.9	14.2	8.9	5.3	3.8	3	2.46
40	0.025	139	101	83.8	60.3	42.5	23.1	15	9.4	5.6	4	3.2	2.6
50	0.02	144	105	87.1	62.6	44.1	24	15.6	9.7	5.8	4.2	3.3	2.7
60	0.017	149	108	89.6	64.5	45.5	24.7	16.1	10	6	4.3	3.4	2.79
80	0.013	155	113	93.8	67.5	47.6	25.9	16.9	11	6.3	4.6	3.6	2.93
100	0.01	160	117	96.9	69.8	49.2	26.8	17.5	11	6.5	4.7	3.7	3.04
250	0.004	181	132	110	79	55.9	30.5	19.9	13	7.5	5.4	4.2	3.47

Rainfall intensities (mm/hr) :: RCP6.0 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	71.1	51.4	42.4	30.3	21.1	11.2	7.16	4.4	2.6	1.9	1.4	1.18
2	0.5	78.1	56.5	46.7	33.4	23.3	12.4	7.92	4.9	2.9	2.1	1.6	1.31
5	0.2	102	74	61.1	43.8	30.6	16.3	10.5	6.5	3.8	2.7	2.1	1.74
10	0.1	120	86.8	71.8	51.5	36.1	19.2	12.4	7.6	4.5	3.2	2.5	2.06
20	0.05	137	99.8	82.6	59.3	41.6	22.3	14.3	8.8	5.2	3.7	2.9	2.39
30	0.033	148	108	89.1	64	44.9	24.1	15.5	9.6	5.7	4.1	3.2	2.59
40	0.025	155	113	93.6	67.3	47.3	25.4	16.3	10	6	4.3	3.3	2.74
50	0.02	161	117	97.3	69.9	49.1	26.4	17	11	6.2	4.5	3.5	2.85
60	0.017	166	121	100	72	50.6	27.2	17.5	11	6.4	4.6	3.6	2.94
80	0.013	174	127	105	75.5	53	28.5	18.4	11	6.7	4.8	3.8	3.09
100	0.01	179	131	108	78	54.9	29.5	19	12	7	5	3.9	3.2
250	0.004	203	148	123	88.4	62.3	33.6	21.7	13	8	5.7	4.5	3.67

Rainfall intensities (mm/hr) :: RCP8.5 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	65.5	47.4	39.1	28	19.5	10.5	6.77	4.2	2.5	1.8	1.4	1.14
2	0.5	71.9	52.1	43	30.7	21.5	11.5	7.46	4.6	2.7	2	1.5	1.26
5	0.2	93.6	67.9	56.1	40.2	28.2	15.2	9.83	6.1	3.6	2.6	2	1.67
10	0.1	110	79.5	65.8	47.2	33.1	17.9	11.6	7.2	4.3	3.1	2.4	1.98
20	0.05	126	91.3	75.6	54.3	38.2	20.6	13.4	8.3	5	3.6	2.8	2.29
30	0.033	135	98.3	81.4	58.5	41.2	22.3	14.5	9	5.4	3.9	3	2.48
40	0.025	142	103	85.6	61.5	43.3	23.5	15.2	9.5	5.7	4.1	3.2	2.62
50	0.02	147	107	88.9	63.9	45	24.4	15.8	9.9	5.9	4.2	3.3	2.73
60	0.017	152	110	91.5	65.8	46.4	25.2	16.4	10	6.1	4.4	3.4	2.82
80	0.013	159	116	95.8	68.9	48.6	26.4	17.1	11	6.4	4.6	3.6	2.96
100	0.01	164	119	99	71.2	50.3	27.3	17.8	11	6.6	4.8	3.7	3.07
250	0.004	185	135	112	80.7	57	31	20.2	13	7.5	5.5	4.3	3.51

Rainfall intensities (mm/hr) :: RCP8.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	77.8	56.3	46.5	33.2	23	12.1	7.64	4.7	2.7	1.9	1.5	1.23
2	0.5	85.7	62	51.2	36.6	25.5	13.4	8.49	5.2	3	2.2	1.7	1.36
5	0.2	112	81.4	67.3	48.2	33.6	17.7	11.3	6.9	4	2.9	2.2	1.82
10	0.1	132	95.7	79.2	56.8	39.7	20.9	13.3	8.2	4.8	3.4	2.7	2.16
20	0.05	152	110	91.2	65.5	45.8	24.3	15.5	9.4	5.5	4	3.1	2.51
30	0.033	163	119	98.4	70.7	49.5	26.2	16.7	10	6	4.3	3.3	2.73
40	0.025	172	125	103	74.3	52	27.7	17.7	11	6.3	4.5	3.5	2.88
50	0.02	178	130	108	77.3	54.1	28.8	18.4	11	6.6	4.7	3.7	3
60	0.017	183	134	111	79.6	55.8	29.7	19	12	6.8	4.9	3.8	3.09
80	0.013	192	140	116	83.4	58.5	31.1	19.9	12	7.2	5.1	4	3.25
100	0.01	198	145	120	86.3	60.5	32.3	20.6	13	7.4	5.3	4.1	3.37
250	0.004	224	163	136	97.7	68.6	36.7	23.5	14	8.5	6.1	4.7	3.86

HIRDS V4 Depth-Duration-Frequency Results
Sitename: Custom Location
Coordinate system: WGS84
Longitude: 173.9639
Latitude: -35.1924
DDF Model

Parameters:	c	d	e	f	g	h	i
Values:	0.00227905	0.5048629	-0.0171481	-0.00340679	0.25418822	-0.0117019	3.23511

Example:	Duration (hrs)	ARI (yrs)	x	y	Rainfall Depth (mm)
	24	100	3.17805383	4.60014923	247.6539946

Rainfall depths (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	9.92	14.3	17.8	25.4	35.7	58.2	76	95	114	123	129	132
2	0.5	10.9	15.7	19.5	27.8	39.2	64	83.5	105	125	136	142	146
5	0.2	14.1	20.4	25.3	36.2	51.1	83.6	109	137	165	178	187	192
10	0.1	16.4	23.8	29.6	42.4	59.9	98.2	129	162	194	210	220	226
20	0.05	18.8	27.3	34	48.8	68.9	113	148	187	224	243	255	262
30	0.033	20.2	29.4	36.6	52.5	74.2	122	160	202	242	263	276	284
40	0.025	21.2	30.9	38.4	55.2	78.1	129	169	213	256	278	291	299
50	0.02	22	32.1	39.9	57.3	81.1	134	175	221	266	289	303	312
60	0.017	22.7	33	41.1	59	83.5	138	181	228	274	298	312	322
80	0.013	23.7	34.5	42.9	61.8	87.4	144	190	239	288	313	328	337
100	0.01	24.5	35.7	44.4	63.9	90.4	149	196	248	298	324	340	350
250	0.004	27.6	40.3	50.2	72.4	103	170	223	282	340	370	388	400

Depth standard error (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	1.2	1.6	1.9	2.5	3.5	6.5	9.1	15	18	21	22	23
2	0.5	1.3	1.8	2	2.7	3.8	7.1	10	17	20	23	24	26
5	0.2	1.8	2.5	2.9	3.8	5.5	9.9	14	23	28	31	33	34
10	0.1	2.3	3.3	3.8	4.9	7.3	13	17	28	33	37	40	40
20	0.05	3	4.3	5	6.4	9.6	16	22	33	39	43	47	47
30	0.033	3.4	5	5.8	7.5	11	19	26	36	43	47	51	52
40	0.025	3.8	5.5	6.5	8.4	13	21	29	39	46	50	55	55
50	0.02	4.1	6	7.1	9.2	14	23	32	41	49	53	58	58
60	0.017	4.3	6.3	7.5	9.9	15	25	34	43	51	55	60	60
80	0.013	4.8	7	8.4	11	17	28	38	46	54	59	64	64
100	0.01	5.2	7.6	9.1	12	18	31	42	48	57	62	67	68
250	0.004	7.1	10	12	17	26	45	60	60	70	76	83	83

Rainfall depths (mm) :: RCP2.6 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.6	15.4	19	27.2	38.1	61.5	79.6	99	118	127	132	136
2	0.5	11.6	16.9	20.9	29.9	41.9	67.6	87.7	109	130	140	146	150
5	0.2	15.1	21.9	27.2	39	54.8	88.8	115	144	171	185	193	198
10	0.1	17.7	25.7	31.9	45.7	64.3	104	136	169	202	218	228	234
20	0.05	20.3	29.5	36.6	52.6	74.1	121	157	196	234	253	264	271
30	0.033	21.8	31.8	39.4	56.7	79.9	130	170	212	253	274	286	294
40	0.025	22.9	33.4	41.5	59.6	84	137	179	223	267	289	302	310
50	0.02	23.8	34.6	43	61.9	87.3	142	186	232	277	300	314	323
60	0.017	24.5	35.7	44.3	63.8	90	147	192	240	286	310	324	333
80	0.013	25.6	37.3	46.4	66.7	94.2	154	201	251	300	325	340	350
100	0.01	26.4	38.5	47.9	69	97.4	159	208	260	311	337	353	362
250	0.004	29.9	43.6	54.2	78.2	111	181	237	297	355	385	403	415

Rainfall depths (mm) :: RCP2.6 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.6	15.4	19	27.2	38.1	61.5	79.6	99	118	127	132	136
2	0.5	11.6	16.9	20.9	29.9	41.9	67.6	87.7	109	130	140	146	150
5	0.2	15.1	21.9	27.2	39	54.8	88.8	115	144	171	185	193	198
10	0.1	17.7	25.7	31.9	45.7	64.3	104	136	169	202	218	228	234
20	0.05	20.3	29.5	36.6	52.6	74.1	121	157	196	234	253	264	271
30	0.033	21.8	31.8	39.4	56.7	79.9	130	170	212	253	274	286	294
40	0.025	22.9	33.4	41.5	59.6	84	137	179	223	267	289	302	310
50	0.02	23.8	34.6	43	61.9	87.3	142	186	232	277	300	314	323
60	0.017	24.5	35.7	44.3	63.8	90	147	192	240	286	310	324	333
80	0.013	25.6	37.3	46.4	66.7	94.2	154	201	251	300	325	340	350
100	0.01	26.4	38.5	47.9	69	97.4	159	208	260	311	337	353	362
250	0.004	29.9	43.6	54.2	78.2	111	181	237	297	355	385	403	415

Rainfall depths (mm) :: RCP4.5 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.8	15.6	19.3	27.6	38.7	62.3	80.5	100	119	128	133	137
2	0.5	11.8	17.1	21.2	30.4	42.6	68.6	88.8	110	131	141	147	151
5	0.2	15.4	22.3	27.7	39.7	55.7	90.1	117	145	173	187	194	199
10	0.1	18	26.2	32.5	46.5	65.4	106	138	171	204	220	230	236
20	0.05	20.7	30	37.3	53.6	75.4	122	159	198	236	255	267	274
30	0.033	22.2	32.3	40.2	57.7	81.3	132	172	214	256	276	289	296
40	0.025	23.4	34	42.2	60.7	85.5	139	181	226	269	292	304	313
50	0.02	24.2	35.3	43.9	63.1	88.9	145	188	235	280	303	317	325
60	0.017	24.9	36.3	45.2	64.9	91.6	149	194	242	289	313	327	336
80	0.013	26.1	38	47.2	68	95.9	156	204	254	304	329	343	353
100	0.01	26.9	39.3	48.8	70.3	99.2	162	211	263	315	341	356	366
250	0.004	30.4	44.4	55.2	79.6	113	184	240	300	359	389	407	418

Rainfall depths (mm) :: RCP4.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.3	16.4	20.3	29.1	40.5	64.9	83.4	103	122	131	136	139
2	0.5	12.5	18	22.3	32	44.7	71.5	92.1	114	134	145	150	154
5	0.2	16.2	23.6	29.2	41.8	58.7	94.2	122	150	178	192	199	204
10	0.1	19	27.6	34.3	49.2	69	111	143	178	210	227	236	242
20	0.05	21.8	31.7	39.4	56.6	79.5	128	166	205	244	263	274	281
30	0.033	23.5	34.2	42.5	61	85.8	139	179	222	264	285	297	304
40	0.025	24.7	35.9	44.6	64.2	90.3	146	189	234	278	300	313	321
50	0.02	25.6	37.3	46.4	66.7	93.8	152	196	244	290	313	326	334
60	0.017	26.4	38.4	47.8	68.7	96.7	157	203	252	299	323	337	345
80	0.013	27.6	40.2	50	71.9	101	164	212	264	314	339	353	362
100	0.01	28.5	41.5	51.7	74.4	105	170	220	273	325	351	366	376
250	0.004	32.2	47	58.4	84.3	119	193	251	312	371	401	419	430

Rainfall depths (mm) :: RCP6.0 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.7	15.5	19.2	27.5	38.4	62	80.1	100	118	127	133	136
2	0.5	11.8	17	21.1	30.2	42.3	68.2	88.4	110	130	141	147	150
5	0.2	15.3	22.2	27.5	39.4	55.3	89.6	116	145	172	186	194	199
10	0.1	17.9	26	32.2	46.2	65	105	137	171	203	220	229	235
20	0.05	20.5	29.8	37	53.2	74.9	122	158	197	235	254	266	273
30	0.033	22.1	32.1	39.9	57.3	80.7	131	171	213	255	275	288	295
40	0.025	23.2	33.7	41.9	60.3	84.9	138	180	225	268	290	303	312
50	0.02	24.1	35	43.5	62.6	88.3	144	187	234	279	302	316	324
60	0.017	24.8	36.1	44.8	64.5	90.9	148	193	241	288	312	326	335
80	0.013	25.9	37.7	46.9	67.5	95.2	155	202	253	302	327	342	351
100	0.01	26.7	39	48.5	69.8	98.5	161	210	262	313	339	355	364
250	0.004	30.2	44.1	54.8	79	112	183	239	299	358	388	406	417

Rainfall depths (mm) :: RCP6.0 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.8	17.1	21.2	30.3	42.2	67.2	85.9	106	125	133	139	142
2	0.5	13	18.8	23.3	33.4	46.6	74.2	95.1	117	138	148	153	157
5	0.2	17	24.7	30.6	43.8	61.3	97.9	126	155	182	196	204	209
10	0.1	19.9	28.9	35.9	51.5	72.2	115	149	183	216	233	242	248
20	0.05	22.9	33.3	41.3	59.3	83.2	134	172	212	251	270	281	287
30	0.033	24.7	35.9	44.5	64	89.8	144	186	229	271	292	304	311
40	0.025	25.9	37.7	46.8	67.3	94.5	152	196	242	286	308	321	329
50	0.02	26.9	39.1	48.6	69.9	98.3	158	204	251	298	321	334	342
60	0.017	27.7	40.3	50.1	72	101	163	210	260	307	332	345	353
80	0.013	29	42.2	52.4	75.5	106	171	220	272	323	348	362	371
100	0.01	29.9	43.6	54.2	78	110	177	229	282	334	360	376	384
250	0.004	33.8	49.3	61.3	88.4	125	202	260	322	382	412	430	440

Rainfall depths (mm) :: RCP8.5 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.9	15.8	19.6	28	39.1	62.9	81.2	101	119	129	134	137
2	0.5	12	17.4	21.5	30.7	43.1	69.3	89.6	111	132	142	148	152
5	0.2	15.6	22.6	28	40.2	56.4	91.1	118	147	174	188	196	201
10	0.1	18.3	26.5	32.9	47.2	66.3	107	139	173	205	222	231	237
20	0.05	20.9	30.4	37.8	54.3	76.4	124	161	200	238	257	268	275
30	0.033	22.5	32.8	40.7	58.5	82.4	134	174	216	258	278	291	298
40	0.025	23.7	34.4	42.8	61.5	86.6	141	183	228	271	294	306	315
50	0.02	24.6	35.8	44.4	63.9	90	146	190	237	283	306	319	327
60	0.017	25.3	36.8	45.8	65.8	92.8	151	196	245	292	316	329	338
80	0.013	26.4	38.5	47.9	68.9	97.2	158	206	256	306	331	345	355
100	0.01	27.3	39.8	49.5	71.2	101	164	213	266	317	343	358	368
250	0.004	30.8	45	56	80.7	114	186	243	303	362	392	410	421

Rainfall depths (mm) :: RCP8.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	13	18.8	23.2	33.2	46	72.4	91.7	112	131	139	144	148
2	0.5	14.3	20.7	25.6	36.6	51	80.1	102	124	145	155	160	164
5	0.2	18.7	27.1	33.6	48.2	67.3	106	135	165	193	207	214	219
10	0.1	22	31.9	39.6	56.8	79.3	126	160	196	229	246	254	260
20	0.05	25.3	36.7	45.6	65.5	91.6	146	186	226	266	285	296	302
30	0.033	27.2	39.6	49.2	70.7	98.9	157	201	245	288	309	321	327
40	0.025	28.6	41.6	51.7	74.3	104	166	212	259	304	326	338	346
50	0.02	29.7	43.3	53.8	77.3	108	173	220	269	317	339	353	360
60	0.017	30.6	44.5	55.4	79.6	112	178	228	278	327	351	364	371
80	0.013	32	46.6	58	83.4	117	187	238	292	343	368	382	390
100	0.01	33.1	48.2	59.9	86.3	121	194	247	303	356	382	397	405
250	0.004	37.3	54.5	67.8	97.7	137	220	282	345	406	436	454	463